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DUODENAL ULCER.*

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Duodenal ulcer and grastric ulcer have been described together until recently. Gastric ulcer was mentioned in the medical literature as long ago as 1600 but duodenal ulcer was first described by Travers in 1817. In this report, Travers describes two cases of perforating duodenal ulcer. The first case was typical: sudden perforation of the ulcer, shock, and death of the patient within a few hours. In the second case the patient had had a long period of dyspepsia. The characteristic feature was pronounced in this case; that is the symptoms were relieved by food and they returned about the time the food was leaving the stomach. These two cases of duodenal ulcer, that were proved at necropsy and were reported 111 years ago, are typical of the cases seen today.

In the few years following the report by Travers, several reports of cases were made in different countries; and, as early as 1830, Dr. John Abercrombie, of Edinburgh gave, clearly and concisely, the clinical picture presented by duodenal ulcer. He said: "The leading peculiarity of disease of the duodenum so far as we are at present acquainted with it seems to be that the food is taken with relish and the first stage of digestion is not impeded, but the pain begins about the time when the food is passing out of the stomach or from two to four hours after a meal."

The treatment of duodenal ulcer was not discussed for many years after this. Moynihan says that H. P. Dean recorded the first case of duodenal ulcer that was successfully treated by operation.

The surgical treatment of duodenal ulcer, as well as that of gastric ulcer, started with the researches and experimental work directed by Billroth and carried out by von Winiwater and Gussenbauer. These experiments were performed on dogs in 1875. At this time, Gussenbauer suggested that gastric resection might prove to be a feasible procedure in gastric ulcer as well as in gastric cancer.

It is generally conceded that the stimulus for the surgical treatment of chronic duodenal ulcer was furnished by W. J. Mayo and Moynihan about twenty-five years ago. Since that time, much discussion has come forth on the subject of whether these cases should be treated conservatively by the physician or whether they should be treated by the surgeon as soon as the disease is diagnosed. Clinicians do not all agree concerning what is the best plan of conservative treatment nor are they in accord as to just how long and how rigidly such treatment should be carried out. On the other hand, surgeons have tried many different types of operative procedure in an attempt to relieve the symptoms produced by duodenal ulcer.

Gastro-enterostomy

Gastro-enterostomy, an indirect operative procedure, has been and still is the operation most frequently employed. This procedure is supposed to relieve the condition by modifying the mechanism of the passage of food through the upper intestinal tract, by overcoming obstruction and spasm, and by making changes in the physiologic processes involved. As a result of this operation, many patients have been completely and permanently relieved. Unfortunately, one factor makes this procedure unsatisfactory in a certain proportion of the cases; and this factor is the development of a secondary ulcer in the jejunum, near the stoma formed by the anastomosis of the stomach to the jejunum. It is impossible to state just how frequently this condition occurs, and, so far, there is no way of telling in which of the cases a stomal ulcer is likely to develop. Young persons, who are so commonly afflicted with duodenal ulcer, are more likely to suffer the development of a jejunal ulcer subsequent to operation than are older persons. Preparation of patients before operation, regulation of

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diet, and other after care will not prevent the formation of jejunal ulcer. I have tried very diligently to devise some scheme by which stomal ulcers might be prevented, but so far I have not been successful. Alkalinization of the stomach for a long time after the operation will not prevent them. In a small group of patients in whom I thought there was some likelihood of a secondary ulcer forming, because of the age of the patient and the acuteness of the ulcer, I had an autogenous vaccine made from the organisms recovered from the ulcer and I vaccinated these patients over a considerable length of time after the operation. So far, none has developed a secondary ulcer; but the series is too small and the time elapsed is not sufficient to enable me to tell whether or not this will have any effect. It is not the frequency with which these secondary ulcers occur but the severity of the condition which they cause that makes this a great problem. To perform gastro-enterostomy for a small lesion in the duodenum of a young man, then to have him return because of recurrence of his symptoms after he had had six to nine months of relief, and to find that a new ulcer has formed, is a very unfortunate situation. If it were not for the occasional stomal ulcer, anastomosis of the stomach to the jejunum would be the procedure to follow in all of these cases; in every other respect, it is a satisfactory plan.

Plastic Operation and Excision of the Ulcer

Many plastic operations on the pylorus, in some of which the ulcer is excised at the time, in others of which it is left undisturbed, have been described in the last twenty years. The principle in most of these procedures has been to do away with the activity of the pyloric sphincter, and in this way to overcome pyloric spasm and to change the physiologic processes involved. It is not my purpose at this time to discuss the different operations that have been performed on the pylorus but I would like to say something about the principle that underlies them.

A number of years ago, in the clinic, we started to excise duodenal ulcers in the cases in which the duodenal cap was free and easily accessible. The results in these cases were fairly satisfactory. We have followed a series of cases for a long time. In those patients who did not do very well, the difficulty seemed to be a residual dyspepsia that was not as severe as the similar disorder that had existed before operation; nevertheless, they were not completely relieved of discomfort. I thought that this might be attributable to the fact that there was still a spastic pyloric sphincter and next, I added to excision of the ulcer a Ramsted incision of the sphincter muscle of the pylorus. I am not sure that this resulted in any higher proportion of satisfactory results, because I soon found that in the adult with a normal pyloric sphincter, incision of this muscle did not do away with its tendency to become spastic. Roentgen-ray examinations made after the operations showed that the contents of the stomach passed through the pylorus under the control of the sphincter in very much the same way as that observed in the cases in which the sphincter had not been incised.

Because of these results I developed a more extensive operation on the pyloric sphincter. At the present time, in the cases of duodenal ulcer in which it is feasible, I excise the entire cap of the duodenum, with the ulcer, and include in the excision the anterior two-thirds of the pyloric sphincter muscle. The purpose of the operation, as I perform it, is to get rid of the ulcer, of the duodenal cap which is the most frequent seat of ulcer, and, at the same time, to take out enough of the pyloric sphincter to destroy its sphincteric activity. When the operation is completed by joining the stomach and duodenum together, the two structures have been converted into one cavity. The contents of the stomach pass directly into the duodenum, and the contents of the duodenum easily regurgitate into the stomach. With this plan, everything has been done that can be done by gastrojejunostomy and the patient has not been exposed to the possibility of a stomal ulcer. Because of fixation or marked deformity of the duodenum, this operation cannot be done in all cases; but in those in which it can be performed, the results have been satisfactory.

It is inconceivable to me that resection of the stomach should ever be necessary in patients with chronic duodenal ulcer. As I have watched the results of surgical procedures, it has seemed to me that the operations that are based entirely on producing changes in physiologic processes have been very unsatisfactory. The most logical operation, for any disease that requires operation, is that which removes

the lesion that produces the trouble and which accomplishes the result with as little disturbance as possible of the surrounding structures. I am very glad to know that some of the English surgeons, and also some of those on the continent of Europe, have been misquoted concerning their ideas regarding radical operations for duodenal ulcer. It seems to me that after this wave of enthusiasm for radical operation, surgeons are coming back very quickly to the conservative plan of treatment. Possibly, as a result of these extensive operations, something may have been learned about the inflammation that exists in the stomach in all cases of ulcer; but so far it has not been possible to put this to any use in furthering knowledge of the pathogenesis of these ulcers.

Pathogenesis

Knowledge concerning duodenal ulcer has progressed to about the same point as that concerning a great many other conditions. Duodenal ulcer can be diagnosed in almost every case in which it is present. Some plan of treatment that will offer relief in most of the cases can be followed out. It seems to me that, from now on, progress is going to be made from further studies in pathogenesis. It is true that, as a result of a better understanding of the clinical picture, many of the ulcers are recognized earlier than formerly they were known to be present. These early cases can be kept under control and the patients can lead an active useful life. The only handicap is that, during two or three periods in the year, it is necessary to watch the diet very carefully. In our own staff at the clinic, composed of several hundred physicians and surgeons, there are between twenty and thirty men who apparently have duodenal ulcer. The roentgen-ray is positive in these cases, and each year the patients have a few attacks of dyspepsia. Between these attacks they are free from trouble.

The problem of the origin of duodenal ulcers has been studied from clinical, experimental, anatomic and pathologic points of view. Cohnheim divided the problem under two headings; namely, the cause of the original defect and the cause of the chronicity. This division of the problem simplified it in some ways. That an acute ulcer may become chronic is a reasonable assumption; nevertheless, it is an open question whether the occurrence of chronicity involves fundamental principles other than those involved in the origin of the defect.

During the first decade of this century the question of the origin of ulcer centered around the ideas of Rokitansky and Berthold. These investigators believed that ulcers are caused by the action of localized vascular disturbance and consequent focal nutritional changes combined with the digestive action of gastric secretion on the devitalized tissue. In principle, this hypothesis is held today.

Aschoff stresses the Cohnheim theory and attempts to explain the cause of erosions, on one hand, and the cause of chronicity, on the other. The factors which tend to produce chronicity are grouped together under the mechanical-functional theory of Aschoff. Furthermore, these two considerations of mechanical erosion and chemical disturbance formed the basis of Mann's experimental investigations of peptic ulcer. The most satisfactory method of producing experimental chronic peptic ulcer is the one devised by Mann. According to him the following points are significant:

1. The chemical and mechanical factors appear to be important in the development of peptic ulcer.
2. The time necessary for an ulcer to develop and to become chronic is relatively short.
3. The ulcer begins at the surface of the mucosa.
4. All complications observed in ulcers in human beings have been noted in experimental ulcers.
5. The ulcer heals readily when protected from the gastric contents.
6. The healing process is characteristic.
7. If for any reason the granulation tissue in the base of an ulcer is injured, profuse hemorrhage may occur.
8. Observations on the process of formation and the process of healing of ulcers disclose the reason for chronicity.

Mann says the ulcers become chronic because the new cells formed in the process of healing are destroyed by the acid or swept away by the passage of gastric contents before they have an opportunity to establish themselves as an integral part of the tissue.

According to the neurogenic theory, ulcers are the result of dysfunction of the vegetative nervous system. Nervous factors produce spasm, in localized areas either of the muscle

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or of the vessels, and circumscribed ischemia of the mucosa results. From this, localized mucosal defects arise. Such defects tend to produce further nervous irritability and thus to favor chronicity. Konjetzny's theory of the inflammatory origin of ulcer is based on gross and microscopic study of tissue resected at operation. A few years ago, many observers had great interest in this theory. At present, however, this interest has lessened, and it seems as if the likelihood that this theory will explain the pathogenesis of ulcer is not as great as formerly it was thought to be. Konjetzny, Orator and Puhl, and others observed that in many cases of gastric and duodenal ulcer there is more or less extensive gastritis and duodenitis.

Undoubtedly, duodenitis is a surgical and pathologic entity but its relationship to chronic duodenal ulcer is not clear. The pathologic data in cases of duodenitis call attention to the work of Rosenow, for the lesions closely resemble those which he produced in animals by injecting specific strains of streptococci. Puhl was able to demonstrate organisms in tissues from cases of gastritis and duodenitis but he could not culture them.

Ulcers form in the jejunum not only following gastro-enterostomy for ulcer of the duodenum but also after resection of the stomach for duodenal ulcer. Furthermore, ulcers recur in the jejunum after resection of the stomach for duodenal and jejunal ulcer. Recurrence of ulcer in the jejunum has been known to occur repeatedly, even when several resections have resulted in the removal of the greater part of the stomach. These experiences tend to support Mann's experimental work and the combined chemical and mechanical theory of the cause of ulcer, but they seem to disprove the idea that the removal of the lesser curvature will prevent the formation of ulcers. Experience seems to show that there is a tendency for the formation of ulcers in certain individuals and that no matter what treatment is undertaken recurrence is almost certain to take place. The factor responsible for this has not been determined and its discovery will yield valuable information concerning the etiology and pathogenesis of ulcer.

Duodenal ulcer is many times more common than gastric ulcer, and it occurs frequently in young men. From the nature of the lesion it seems probable that duodenal ulcer heals more often of its own accord than does gastric ulcer. In many instances the duodenal lesion is a localized area of inflammation. Sometimes the process is more diffuse, and extends throughout a considerable part of the upper third of the duodenum. Walton says that acute duodenitis occurs frequently in students under nervous tension such as preparing for an examination and that it heals promptly when diversion is supplied. There are undoubtedly two separate and distinct lesions in the duodenum; one is a localized area of inflammation, and the other is a true ulcer. Under no condition does a carcinoma originate in the duodenum, and these lesions must be considered not only benign, but also comparatively simple.

Conservative Treatment

In view of these facts, it seems to me that conservative treatment is definitely indicated, and that if many of these patients were aware of their condition early in the trouble they could be kept comfortable with very little effort or inconvenience on their part. Alvarez says that during the last ten years he has been impressed with the fact that so few of the patients with duodenal ulcer whom he has seen have ever had any treatment which a specialist would regard as adequate. In many cases the diagnosis had not been made; but even when it had been made, most of the patients had had to suffer for years with nothing more than a prescription for alkalies and a warning against the use of meat or greasy foods. He further says that as so often happens, one of these patients would return to report that since he had taken food every two hours he had lost all distress. I think everyone is aware of the fact that not enough attention is paid to mild dyspepsia. If an accurate diagnosis is made early and the proper treatment, which is very simple, is instituted, many of these patients would be entirely relieved.

The indications for operating in cases of chronic ulcer of the duodenum depend on several factors. The length of time symptoms have existed should be considered. If they have been present for a long time and if the patient has had several periods of good dietary management, without relief, operation should not be postponed. If the symptoms have been present for a short time only, and conservative treatment has not been instituted, it should be instituted at once. There is plenty of evidence

to show that some ulcers heal spontaneously and also that dietary management, if started before the condition becomes chronic, may result in complete relief of symptoms and possibly in the healing of the ulcer. The age of the patient should be taken into consideration. A young person, with a short history and mild symptoms, should be placed on a dietary regimen for a considerable period. The severity of the symptoms in any case will help to determine the plan to be followed, because, if there is a constant tendency to perforation or bleeding or if there are severe gastric upsets that are not relieved quickly by diet, operation is indicated. The nervous tendency of the patients also should be taken into consideration. Patients with a highly sensitive nervous system do not bear well any type of operation on the stomach. Very rarely perforation occurs during most rigid treatment. It is a mistake, however, to continue dietary treatment if nothing is being accomplished and if the symptoms return with the least indiscretion. About 65 per cent of the patients with duodenal ulcer seen at the clinic are advised to submit to operation.

Summary

Dudoenal ulcer is a very common condition. It is always a benign lesion. Unless there is a tendency toward perforation, hemorrhage, or obstruction, there is no contraindication to trying medical management. Many of the early ulcers heal spontaneously. Other early ulcers undoubtedly can be encouraged to heal by conservative treatment. In many instances medical management simply brings about relief of symptoms, and the trouble returns as soon as the regimen is discarded. The results of the surgical treatment of duodenal ulcer are sufficiently satisfactory to justify operation. It would seem as though about every conceivable plan for operating on these patients has been tried out. From a study of the results, the indications are that the more conservative the operation the better the prospects for satisfactory results.

In certain individuals ulcers continue to form following any type of operation. These individuals do not respond to medical management. By a more intensive study of cases of this type it may be possible to get a better conception of the pathogenesis of duodenal ulcer. Progress in the treatment of these cases will be brought about by a better understanding of the pathogenesis.

GASTRECTOMY FOR GASTRIC ULCER AND GASTRIC CANCER.*

By J. M. EMMETT, M. D., Clifton Forge, Va.

In the absence of definite proof of the etiology of ulcer it is evident that the relative value of the various surgical procedures, in their ultimate analysis, must be determined by the final results obtained and they should not be dependent upon the uncertainty of the various causes of ulcer. The multitude of operative procedures in vogue today confirm the opinion that no specific surgical treatment has been established which will meet all our demands. The literature which is being built up around gastric surgery for the treatment of peptic ulcer is confusing and uncertain. One large western clinic reports, following gastro-enterostomy, the occurrence of gastro-jejunal ulcers in three per cent of cases and one eastern clinic reports thirty-three per cent of gastro-jejunal ulcers. Such reports are confusing and they create a great dilemma in the mind of a young clinic which is seeking to standardize, in a manner, its stomach surgery. We have no positive convictions as to when the regime of medical treatment should be discontinued in ulcer patients and when surgical procedures should be employed. We recognize, of course, certain definite indications for the employment of surgery in peptic ulcer, but the vast majority of ulcer patients might just as well be handled medically as surgically.

During the past year we have operated upon only nine and three-tenths per cent of our proven ulcer patients. Because of the many unfavorable surgical results obtained in the older gastric cases, this special branch of surgery is not in particularly favorable repute. Frequently, patients who have been subjected to operation have not experienced their anticipated improvement and such patients have been very reticent to recommend surgery for the relief of ulcer symptoms in candidates for surgical treatment. The general practitioner has not been sufficiently impressed by our good re-

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sults to encourage him to advise his ulcer patients to consider surgery, except as a treatment of last resort. The surgeon will certainly never be able to convince the medical man that indurated ulcers of the stomach and duodenum are surgical diseases, until he can demonstrate a lasting and permanent cure following operation.

Any of the generally employed surgical procedures, such as gastro-enterostomy, sleeve resection, or subtotal gastrectomy, disturb very materially the normal gastric physiology. Efficient control of ulcer symptoms seems dependent upon maintaining gastric motility and, to a greater extent, upon our ability to reduce the gastric acidity in some manner which is permanent. Ulcers of the duodenum which are producing obstructive symptoms present, clinically, a different problem and, when proper drainage of the stomach is established and rest is assured the pylorus, the oedema around the ulcer rapidly subsides, the pylorus becomes patent, and relatively normal gastric physiology ensues.

We have been able to follow up, with a fair degree of accuracy, a group of twenty-five of our patients upon whom we have done gastro-enterostomies—fourteen of whom had gastric ulcers and eleven had duodenal ulcers. Two of the patients with gastric ulcers have developed proven gastrojejunal ulcers. One duodenal case has a similar lesion. Three of our gastric patients are having various degrees of digestive distress, meaning that they are not entirely symptom free. Minor digestive distress is observed in only one of the duodenal cases. From our limited analysis few deductions can be drawn, but grossly our results agree with observers who have had greater experience.

It is generally agreed that the removal of the distal third of the stomach, including the pylorus and a portion of the first part of the duodenum, is the only reliable method of producing a state of anacidity, and if one lends himself to the belief that gastric ulcers thrive in an acid media, or its progress is in any way affected by high acidity, then the operation of subtotal gastrectomy is certainly indicated in large gastric lesions. Gastric motility is less frequently altered after a subtotal gastrectomy than it is following many of the palliative procedures.

Further indications for the selection of subtotal gastrectomy in gastric ulcers are found when one considers the undeniable fact that gastric ulcer plays an important part sometimes in the production of gastric malignancy; that the palliative operations are less constant in their ability to cure gastric ulcer, and that many patients who have had gastro-enterostomies still go on to gastric perforation and hemorrhage.

About eighteen months ago we first performed a subtotal gastrectomy for the relief of gastric ulcer. Since that time we have had occasion to do this operation on four other such patients. The results obtained in this very limited experience have been so satisfactory that we are encouraged to report them. Prior to our employment of subtotal gastrectomy for the treatment of ulcers we were accustomed to feel that our stomach patients were rarely ever entirely normal after operation. The patients upon whom we have done partial gastrectomies are happy, well, and absolutely symptom free. None of them, even with unrestricted diet, complains of symptoms suggesting crippled gastric digestion.

The early advocates of subtotal gastrectomy for the treatment of gastric ulcer claimed that these operations were never followed by ulcers at the anastomosis. Sporadic reports of such complications now are appearing in the literature, but we are encouraged to feel that this complication is not so constant following partial gastrectomy as was experienced following the palliative operations. We feel that we may well choose the more extensive operative procedures, regardless of the slightly higher immediate operative mortality, since the final operative results are much more satisfactory.

I do not wish you to infer that I feel gastro-enterostomy has no place as an elective surgical procedure, because, unless some more rational palliative measure is developed, I shall always feel that gastro-enterostomy may be practiced with benefit upon a large group of patients. However, I feel more emphatically each year that the greatest number of peptic ulcers are, even yet, best handled by intelligent medical management. When surgery is indicated and employed, I feel that we should certainly be able to offer our patients a fair chance of a permanent and a certain cure, and that we are positively obligated to avoid the possibility of increasing the violency of their symptoms as the result of our treatment.

Observers generally are of the opinion that gastro-enterostomy is followed by a very satisfactory percentage of cures in duodenal ulcers, and we have felt satisfied to continue with its employment in this particular type of lesion. I am not sure, however, that even here a change in our policy might not prove beneficial to the mass of such patients.

Whenever possible we have done the typical Billroth I operation. It has been employed in every case where there is sufficient serosa on the posterior wall of the duodenum to insure a safe approximation of the serous surface for the anastomosis. This particular operation disturbs, to a lesser degree, normal gastric physiology, it re-establishes the normal continuity of the gastro-intestinal tract and, as has been shown by X-ray studies, it favors the development of a new sphincter which possibly effects rhythmic contraction of the stomach. When the motility of the duodenum will not admit of a direct end to end anastomosis with the stump of the stomach, then we have done the Polya modification of the Billroth II operation.

I am encouraged to discuss briefly the problem of subtotal gastrectomies in the treatment of cancer of the stomach because of the change in my own reactions towards this subject. It has not been many years since I felt that patients suffering with cancer of the stomach were hopelessly crippled and I made little or no effort to relieve them. Occasionally we did do gastro-enterostomies upon these patients, but the vast majority of them died in the hospital. We have under observation at the present time one patient whom we operated upon and did a gastro-enterostomy for malignancy of the stomach about two years ago. This man made an immediate satisfactory operative recovery and has attended to his duties as a merchant until six months ago when his gastro-enterostomy gradually became occluded as the result of the extensive cancer invasion. In this particular case the extent of the lesion prohibited a subtotal gastrectomy, but I feel reasonably sure had it been physically possible to have removed his lesion at the time we operated upon him that this man would probably have gotten a permanent cure.

In advocating surgical treatment for cancer of the stomach we need not fear the criticism of our colleagues because the medical profession is unanimous in its opinion that only surgical intervention can cure these victims. There is no recorded instance of anyone having cured cancer of the stomach in any other manner. Balfour has reported fifty-three per cent cures following subtotal gastrectomy for cancer of the stomach, when the lesion has been limited to that organ. He further reports twenty per cent of cures when there was a definite malignant metastasis in the perigastric lymph glands. He reported an operative mortality of only five per cent. Few of us could expect this low mortality rate to begin with, but with the recent improvement in surgical technique for the practice of this procedure we may be able to employ this operation with a mortality of which we need not be ashamed. It should further be remembered, however, that we are dealing with a disease which claims one hundred per cent of its victims.

I feel that the medical profession has an erroneous opinion as to the comparative malignancy of cancer of the stomach. Dr. Margaret Warwick has recently reported in *Annals of Surgery* detailed necropsy findings in 176 fatal cases of cancer of the stomach. She found that twenty-three per cent of these fatal cases did not have evidences of metastasis in any portion of the body. Further evidence is found in her report to substantiate the opinion that cancer of the stomach is ordinarily a slow growing disease and that it is usually the terminal cause of death in its victims and that intercurrent disassociated disease rarely plays an important part in the production of death.

The relative location of the lesion in cancer of the stomach determines largely the early production of symptoms: that is, a large lesion may exist along the wall of the stomach without producing symptoms, while a comparatively small lesion located at the pylorus may produce early gastric obstruction and consequent starvation without surgical intervention.

The diagnosis of cancer of the stomach may be accurately made in practically all cases. Fluoroscopic study by a trained roentgenologist will give unmistakable evidences of the presence of large gastric lesions. Of course the X-ray will not determine the metastatic involvement. I am inclined to feel, however, that, unless the case is a terminal affair, then an exploratory laparotomy should be resorted to after the immediate safeguards have been

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thrown around our patients. I am convinced that many apparently advanced cases, with massive lesions in their stomachs, may be resected and years of freedom offered them, even granting permanent cures may not always be anticipated.

I believe that the particular operation of choice in cancer of the stomach should be along the line of the Billroth I when practical. When the motility of the duodenum prohibits such an anastomosis, the Billroth II operation, with the modifications of Polya and Balfour, will prove entirely saisfactory. I am impressed with the two stage operation which has recently been devised by Dr. Balfour and I believe that it will prove of tremendous advantage in the treatment of debilitated gastric cancer patients, since the primary stage of the operation will enable us to prepare our patients for the intake of food so that their physical condition may be satisfactorily built up for the final operative procedure.

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UNUSUAL DUODENAL CONDITIONS AS DEMONSTRATED BY X-RAY.*

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and
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This communication is really more a series of unusual case reports than a true paper. During the last three or four years, the X-ray Department of the University of Virginia Hospital has had some rather interesting duodenal cases differing from the straight run of ulcers, and we are presenting this group to bring out the fact that lesions other than ulcer do involve the duodenum. Among the most of our medical friends, when the word duodenum is mentioned, the majority respond "ulcer". In our experience, we have found other pathological conditions to be not infrequent. These are picked up in the course of a regular gastro-intestinal series and require no special examination.

Carcinoma of the duodenum itself is quite rare, but in the last three years, we have had two cases of malignancy in which the duodenum was involved. The first case was an old colored man 85 years old, with a constant duodenal deformity, which was thought to be ulcer. He was discharged, died two months later, and an autopsy showed generalized abdominal carcinomatosis with invasion of the liver, the hepato-duodenal and gastro-hepatic ligaments and the pancreas. These masses pressing into the duodenum gave our deformity. There was no involvement of the stomach.

The second case was a colored woman 69 years old, who showed a marked constant deformity of the duodenum, and a 60-75 per cent gastric residue. The natural diagnosis here again was duodenal ulcer, but the first case made us a little cautious, and we qualified our usual flat-footed diagnosis by stating "probable" duodenal ulcer. Operation done on account of the obstruction showed a "carcinoma of gall-bladder which had invaded the intestine," quoting from the operative note.

Diverticula of the duodenum are by no means rare, and many times are symptomless. These diverticula may be either true congenital diverticula, or may be sacculations arising from the duodenal wall secondary to penetrating ulcers. We know of no differential diagnostic points as far as the X-ray examination is concerned except that congenital diverticula are usually in the second and third portion, ulcer in the first portion. These diverticula vary in size, number and distribution. When small, they may easily be confused with the valvulae conniventes, and doubtless we have overlooked many of these small outpocketings.

For present consideration, we have selected three cases showing rather large diverticula. The first case is a man 73 years old, who had had stomach trouble since he was 15 years old. He had gone the rounds of practically all the gastro-enterologists in the East, and had had every diagnosis made except diverticulum of the duodenum. Fluoroscopic ex-

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amination showed a smooth walled, large projection from the wall of the second portion of the duodenum, which was distinctly separate from the duodenal lumen. This case was not operated, since his symptoms were of insufficient gravity to warrant a big operation at his age.

The second case of diverticulum is a woman 71 years old who has had a stomach trouble for 40 years, who showed two extra-luminal pockets. There were also diverticula along the colon in this case. The third case also showed both duodenal and sigmoid diverticula.

We will present two cases which illustrate why occasionally X-ray diagnosis of duodenal ulcer is not confirmed by operation. Both of these cases showed definite constant duodenal deformities. The first was examined by one of us (Archer) in 1924 and showed an enormous duodenal bulb with an incisura on the lesser curvature. In 1927 this case was reexamined and showed a still larger first portion of the duodenum with an apparent pocket. On account of the patient's rather severe symptoms, the referring physician advised operation. When explored, this patient showed only a red stippling of the portion of the duodenum noted as pathological on X-ray examination. This whole area was excised and a gastro-enterostomy performed. On the inner surface of the excised area many small superficial erosions were seen. The second case of this group showed much the same appearance both from the X-ray and operative examinations. The stippled area in this second case was also excised. Microscopic examination of sections from both cases showed erosion of the mucosa and muscularis with round cell infiltration.

One quite interesting case was that of a woman 39 years old who had had "stomach trouble" for one year. X-ray examination shows a spastic pylorus with a very slight irregularity in contour which could be either spasm or ulcer. There was a gastric residue of about 20-30 per cent at six hours, at which time the stomach should be empty. The patient's symptoms became progressively worse, and she was explored with a pre-operative diagnosis of probable small ulcer in the pyloric ring. At operation the pylorus was spastic and markedly thickened, but no ulcer was demonstrated on either the exterior or interior of the stomach or duodenum. A pyloroplasty after the method of Judd, Horsley and others was performed. The patient has been entirely relieved since then. This is the second case of this character which we have observed. In a talk with Dr. Alexander Moore, head of the X-ray Department of the Mayo Clinic, he stated that they had operated several similar cases and that pyloroplasty had relieved the symptoms.

Another unusual case is a man 33 years old who presented an obstruction in the second portion of the duodenum with an enormously dilated bulb, and a very large twenty-four hour gastric residue. The interesting feature of this case was the absence of vomiting in a case of almost complete obstruction, the patient complaining only of gastric discomfort and a "heavy feeling" after meals. At operation a very marked constriction of the second portion of the duodenum was found, apparently due to ulcer.

Summary

(1) Lesions other than ulcer are not infrequently found in the duodenum.

(2) All niche-like deformities of the duodenum are not ulcer, and if the case suggests malignancy from the clinical standpoint, the patient should be explored.

(3) True diverticula sometimes give symptoms and are not very rare.

(4) Periduodenitis may give a constant deformity of the duodenum similar to ulcer, due to spasm in the muscularis which is not present at operation, which shows only ulceration of the mucosa.

(5) Certain cases of partial pyloric stenosis, strongly suggesting pyloric ulcer, are due to thickening and spasticity of the pylorus.

Discussion.

Dr. J. W. Preston, Roanoke: I am sure I express the sentiments of all of you when I say to Dr. Judd that we certainly appreciate his coming down to be with us today. His paper will be very valuable to all of us, I am sure, because Dr. Judd is recognized everywhere as an authority on duodenal conditions. We certainly thank you, Dr. Judd.

Dr. A. L. Gray, Richmond: I have been very much interested in these case reports by Dr. Archer, especially the case (a slide of which he showed) which seemed to present a pyloric obstruction, yet there was no demonstrable lesion. I am satisfied that on Tuesday morning I reported a case identical almost with this one. We shall occasionally have an almost complete pyloric obstruction, in which we cannot demonstrate an actual deformity in the contour either of the duodenal bulb or on the gastric side.

While conditions involving the bulbus duodeni are perhaps more frequently correctly diagnosed than in any other portion of the gastro-intestinal tract, this

is not true of the duodenum beyond the bulb. Fortunately, ulcers are thought to be rare in the duodenum distal to the bulb, but how often symptoms more or less typical of duodenal ulceration are due to undiscovered ultrabulbar ulcerations is an open question. It is usually impossible to obtain a sufficiently well filled duodenum to exclude the presence of a lesion involving only the duodenal wall; in fact, a fully distended duodenum is usually indicative of obstruction distal to the filled portion.

The most frequent deformities of the first and second portions are the result of periduodenal adhesions resulting either from ulceration or other inflammatory condition of the duodenum or of a pericholecystitis from a diseased gall-bladder. Occasionally, a definite obstruction occurs from bands, congenital or acquired, at the duodenojejunal junction; and these may give rise to severe symptoms which are relieved only by surgical procedure. These are, of course, demonstrable only by a careful X-ray study of the transverse portion of the duodenum, noting the facility with which the meal passes into the jejunum, the degree of distention, shape, and conformation. This condition was brought to the attention of roentgenologists in a report of clinical cases by Dr. H. M. Imboden, of New York, about five years ago.

Diverticula, as Dr. Archer has said, are not at all rare in this portion of the alimentary tract; and unless there is an accompanying inflammatory condition they give rise to no distressing symptom and are usually ignored.

Occasionally, the ampulla of Vater fills with the opaque medium, which it may retain after the small intestine has emptied. It may be quite difficult to distinguish such a condition from a duodenal niche from an ulcer or from a diverticulum, but its location and size are usually sufficient to enable one to make the differentiation.

A study of the course of the duodenum and the behavior of the meal in its course through the duodenum may and, in fact, will often reveal the presence of a tumor of the head of the pancreas. An enlarged Riedel's lobe may also produce duodenal deformity, and of course this is true also in some cases of carcinoma of the liver or other portions of the bile tract.

Dr. Stuart McGuire, Richmond: I have practically nothing to add to what Dr. Judd has said, and I discuss his paper chiefly to show my appreciation of the honor he has done our society by coming so long a distance to attend our meeting.

We have had two papers this morning, one on duodenal ulcer and one on gastric ulcer. I am glad there were two papers and that the conditions were not discussed together, as is often done, under the term "peptic ulcer." Duodenal and gastric ulcers differ in their symptoms, in their pathological tendencies, and in their indications for treatment. What I am going to say will be limited to duodenal ulcer.

All cases of duodenal ulcer do not require operation. Many patients can be cured by medical treatment, and others can be kept on their feet in reasonable comfort by proper medical management. Dr. Judd tells us that there are now twenty or thirty members of the staff of the Mayo Clinic who have duodenal ulcer. These men are at work and will not be operated on as long as they do well. Now, what are the indications for operation for duodenal ulcer? The first is a rebellious temperament, which makes the patient unable or unwilling to observe the prudence which is necessary to prevent discomfort. The second is induration and contraction of the ulcer, which produces mechanical deformity, and, possibly, obstruction at the pylorus.

Two types of operation are done for duodenal ulcer. The first is an indirect one, consisting in making a new opening by a gastro-enterostomy. The second is a direct one, consisting in the removal of the ulcer by some type of pyloroplasty. Some surgeons are very partisan in their views and, in advocating one type of operation, criticise and point out every possible objection to the other. The result of this contention among surgeons has been to give all surgery for duodenal ulcer a bad name. This is as much to be regretted as it is undeserved. There are some cases in which a gastro-enterostomy is clearly indicated, and there are other cases where a pyloroplasty is the best operation to employ. No surgeon should be wedded to one operation. A patient should not be fitted to the operation, but the operation should be fitted to the patient. I know from practical experience that a properly selected and properly executed operation for duodenal ulcer will give complete relief in ninety per cent of the cases.

Dr. J. Shelton Horsley, Richmond: I know we are all greatly interested in this symposium on peptic ulcer and are deeply grateful to Dr. Judd for his clear exposition of the subject. I think Dr. McGuire has struck exactly right the keynote in this thing; that is, to use the operation which fits the case. There have been medical men, and perhaps still some exist, who say that practically all peptic ulcers should be treated medically. That is just as much an error as to say that all peptic ulcers should be treated surgically.

All peptic ulcer patients should have medical treatment, either before the operation, or after, or both. The acute ulcers are cured with medical treatment, particularly acute ulcers of the duodenum. Stomach ulcers are more difficult to cure, and there is always the possibility of cancer. Just what that possibility is, opinions differ. McCarty, of the Mayo Clinic, said once that about 65 per cent of gastric ulcers show histological evidence of cancer; on the other hand, Ewing goes down to as low as 2 per cent. Conservative men like Finney say 15 per cent. In a very careful study at the Peter Bent Brigham it was shown that there is a type of cancer that can exist as an ulcer, or else there is a cancerous degeneration, which amounts to the same thing, in 20 per cent of all cases diagnosed as chronic gastric ulcer. If an operator goes in to treat these patients surgically with only one operation, one string for his bow, the patient is in a somewhat precarious condition. It is probably better to treat that patient medically. But when the patient has had reasonably intelligent treatment for two or three months or possibly half a year and still has symptoms, what are you going to do about it? Are you going to be a Christian Scientist, as Dr. Raiford said this mornnig, and forget it? You have to select the type of operation that will best suit the individual indications. Then, after that, what are we going to do? What do you do when you have a bad fracture? Immediately after you set it you would not tell the patient to jump around. You follow biological rules and laws for physiologic rest and apply a splint. So in these cases, after the pathology has been removed they should have intelligent treatment in the way of diet that will rest the stomach as much as possible for at least several months after operation. To continue it all the time is unwise.

In the matter of pyloroplasty, I have been doing for about ten years an operation that perhaps most

of you are familiar with. This operation is indicated only in small duodenal ulcers which cannot be cured by medical means and which are located in the first part of the duodenum. If it is a large ulcer, infiltrated, or with adhesions, then some other type of operation ought to be done.

Reducing acid in the gastric juice is all right in a way, but in patients with a little gastritis and a small duodenal lesion it does not appeal to your common sense to take out more than half of the stomach and make the patient suffer from achlorhydria all his life. Continuous achlorhydria is by no means free from many potential dangers. You would not do an amputation at the knee joint for ingrowing toe nail. You have to suit the operation to the individual case.

DR. HUGH TROUT, Roanoke: I want also to join in thanking Dr. Judd for coming to Virginia.

Dr. McGuire, of course, hits the nail on the head, as he always does; he epitomizes the situation exactly. In our personal experience we have found that our percentage of recurrent jejunal ulcers has been markedly decreased by having these cases come back once a month so that we can follow them up medically, also have gastric analyses and X-rays made, making them understand that for a period of one year they are still under treatment, and also impressing on them the necessity of not breaking training. We have had a number of catastrophes at Christmas time, and Christmas time is a season we dread for these cases.

DR. E. STARR JUDD, Mayo Clinic, Rochester, Minn., closing the discussion: I just want to say that I have enjoyed coming down to Virginia very much and have certainly enjoyed hearing the discussion of these different points. I was very much interested in Dr. Emmett's paper on resection of the stomach for gastric ulcer and also in Dr. Archer's paper.

I think Dr. McGuire and Dr. Horsley brought out the principal points which I wanted to emphasize in this paper. I have been very much opposed to the term "peptic ulcer," with all due apologies to Dr. Horsley, and also to the term "gastroduodenal ulcer," because, as Dr. Emmett stated in his paper, gastric ulcer and duodenal ulcer are two entirely different conditions. While peptic ulcer is a good word, the difficulty is that it throws these two different conditions together.

Our experience has been, as Dr. Emmett reported, that a much more radical procedure is indicated. In the first place, as he said, the first thing is to get rid of the ulcer. No matter how short the duration or how slight the symptoms, we never know the nature of that ulcer until it has been studied histologically. To my mind the question of whether a gastric ulcer becomes cancerous is not the important thing at all, but that we are not able to tell whether it is cancer until we take it out. To my mind, the excision of gastric ulcer alone does not give satisfactory results. In our experience with gastric ulcer it is a question of getting rid of the gastric ulcer, and the solution there, as Dr. Horsley said, is not in one particular type of operation. If it is more satisfactory to resect the stomach and if it can be done with less operating and is more satisfactory to the patient, then it is better to do that than to do an excision and gastroenterostomy. I think gastric ulcer and duodenal ulcer are two different problems. Such operations as gastro-enterostomy do not cure cases of gastric ulcer as they do those of duodenal ulcer.

While we have had some cases that might be called primary cancer of the duodenum, we had to stretch our imagination a little bit. They did not in any way resemble ulcer, at any rate. Cancer does not have to be taken into consideration in the duodenal ulcer cases, but it must always be taken into consideration in the treatment of the gastric ulcer.

In our experience, also, duodenal diverticula are practically always associated with ulcer. The deformity that results from the diverticulum seems to be a part of the ulcer process. In other words, in practically all of the cases we have operated upon for diverticula we have found ulcer present.

I have been particularly interested in the subject of spastic pylorus. It has been surprising to me how often the roentgenologists are able to tell us there is a small ulcer at the pylorus which we cannot find until we open the abdomen.

Regarding the medical treatment of duodenal ulcer, I particularly wanted to mention those cases on our staff that we know have duodenal ulcer. I think there is no question about it. They have periods of dyspepsia at intervals during the year. They can be just as careful as they want to in every way about their diet, but they have periods of dyspepsia. That passes off in a few days, and then they can eat anything they want and be perfectly free from dyspepsia. It seems to me it is a clinical problem to be worked out by the clinician. I think these cases should be kept under medical management as long as they can be. If they are not having hemorrhages, not having sharp pain, and are amenable to management, then keep them under medical treatment; if not, use surgery. Young people, especially, are apt to have secondary ulcers. In bleeding duodenitis, if there has been only one hemorrhage I think we might try medical treatment, but if the patient has another hemorrhage the ulcer should be excised.

Regarding work on the sympathetics, there is very little I can say about it except that some men in the Clinic are very much interested in the results they get in duodenal ulcer cases by section of the sympathetics from the cornua running all the way down to the pylorus. Dr. C. H. Mayo is particularly interested in it.

DR. V. W. ARCHER, University, closing the discussion: I have very little to add except to say that what I wished to imply in speaking of carcinoma involving the duodenum is that, on account of its being adjacent to the duodenum and deforming it, I could not differentiate this irregularity from the niche of an ulcer.

In diverticula of the duodenum, in two of the cases that were shown, we found associated diverticulosis of the colon, of the sigmoid, particularly. That seemed to indicate to me that probably we had a similar condition in the duodenum; we thought we had, perhaps, a diverticulosis throughout the intestinal tract, finding it in the sigmoid and again in the duodenum.

AGRANULOCYTIC ANGINA WITH REPORT OF CASE.*

By A. L. TYNES, M. D., Staunton, Va.

Agranulocytic angina is the somewhat formidable term used to describe a sore throat associated with certain blood changes and was first recognized in Germany in 1922 by

*Read at the fifty-ninth annual meeting of the Medical Society of Virginia, in Danville, October 16-18, 1928.

Schultz, Bantz, Leon and others. Swift to identify it, Beatrice R. Lovett,[1] of Chicago, reported the first case in this country. While the later case reports of this disease show some dissimilarity from the earlier reports, particularly as to age and sex distribution, the description of the main characteristics of the disease as now reported remains essentially the same.

There is the preponderance among women, the age incidence and the sore throat, with leukopenia due to the disappearance from the blood of almost all of the white cells belonging to the granular or myelogenic series, accompanied with a relative increase in the number of lymphocyte cells,—in other words, a neutrophile leukopenia and a relative lymphocytosis.

As pointed out by Schenk and Peper,[2] while most of the cases reported have had total leukocyte counts below normal—some as low as 900 per cubic m. m.—in a few cases the total count has been normal, or even above normal, during at least a part of the illness, but always showing a relative lymphocytosis and a neutrophile leukopenia. Thus, one of Zadek's cases had a total of 17,100 of which 86 per cent were lymphocytes. This case was perhaps a case of infectious mononucleosis and recovered, whereas, in the earlier cases reported with characteristic leukopenia, all died.

Etiology

The pathogenesis of this interesting disease is still unknown, but the consensus of opinion seems to be that it is not a definite disease entity.

Zikowsky[3] believes that it is a "severe form of sepsis occurring in a weakened organism, resulting in injury to the leukopoietic system as such and in paralysis of the organ complex (liver, spleen and endocrine glands), the secretions of which stimulate the bone marrow and regulate the entrance of the granular cells into the blood stream".

Friedmann[4] thinks that the disease is not due to an infection at all, but that it originates in an "endogenous disturbance probably of endocrine origin".

Skiles[5] seems of the opinion that the condition is brought about by one of two factors: "A specific infection resulting in local necrosis with the formation of a specific toxin for the bone marrow, or else as a primary affection of the bone marrow resulting in an inhibition of the granulocytic formation, due to lowering of the resistance of the patient".

The laboratory findings have not been constant and have thrown but little light on the etiology of the disease.

Cultures from the oral cavity show a variety of organisms such as Vincent's spirochaetes, B. Pyocyaneus, Pneumococci and Klebs-Loeffler.

Blood cultures have usually been sterile, but in some cases streptococcus, staphylococcus, B. Pyocyaneus and B Coli have been found.

Symptomatology

Agranulocytic angina is said to occur chiefly in middle-aged women. Kastlin[6] reports 78 per cent in females and 22 per cent in males.

In his review of the symptoms in the series, Kastlin found them distributed as follows: Fever forty-three cases; sore throat thirty-two; dysphagia twenty-five; jaundice twenty-five; malaise fourteen; pains four; vomiting three; bleeding from mucous membrane two.

The mode of onset was acute, coming in a period of good health in twenty-eight, while in the remaining fifteen the acute manifestations developed after a protracted period of ill health, or following definite illness. The temperature range at the onset of recognizable symptoms was from 101 to 105 F. Exhaustion usually developed early, and coma often preceded death.

Regional adenopathy and enlargement of the liver and spleen were observed, but were not constant. The average duration of illness was four to eight days, while the extremes were two to forty-two days. There were three recoveries in this series of forty-three cases, a mortality of about 70 per cent. In the cases which recovered, the blood picture returned to normal.

The age of the females averaged forty-six and of the males twenty-nine; and the extremes of age were four and one-half years and seventy-four years. In this series twenty-seven presented negative past histories, while sixteen showed previous histories of such illnesses as oral infection, typhus, tuberculosis, syphilis, pneumonia, operations, rheumatism, etc.

Schultz[7] does not consider the tonsil as the portal of entry, but as only a point of localization of the disease. This is evidenced by the fact that in a case with recovery which he reports, the tonsil was not affected until late in the disease, and V. K. Hart[8] reports a case

in a patient who had had a previous tonsillectomy.

Pathology

In Kastlin's forty-three cases the mouth always showed an inflammatory process. Ulceration and necrosis were most frequent, including the tonsils, throat, gums, and extending into the larynx and esophagus. Extra oral ulcerations were found in the gastro-intestinal tract, cervix, symphysis and conjunctiva. Cutaneous and petechial hemorrhages were found at autopsy.

There was frequently enlargement of the cervical lymph nodes, and in a few cases, enlargement of the liver and spleen.

Leukopenia with a relative lymphocytosis is always seen at some stage of the disease. The decrease of polymorphonuclear cells, as has been said, is both relative and actual, and they may disappear entirely. There is a decrease in the number of granular cells in the bone marrow which is of significance in accounting for the pathogenesis of the disease.

This was demonstrated to be true in the living body in three cases by Zadek, Schultz and Jacobowitz, who examined the bone marrow which they took from the sternum during the height of the disease.

Friedmann,[9] in reporting his series of twenty-nine cases, states there was pronounced leukopenia in all of his cases; while granulocytes were not always entirely absent they were greatly reduced in numbers. The absolute number of erythrocytes was very much reduced in most of his cases; in a few cases however, they were either normal or slightly increased. The number of blood platelets was normal or increased in all cases.

In his fourteen necropsies, he found erythroblasts and megakaryocytes were present in normal numbers and myelocytes were not entirely lacking; and in one case he found granulocytes in the bone marrow on puncturing the sternum immediately after death.

Aubertin and Levy,[10] after reporting their own cases and reviewing fourteen other cases in the literature, conclude that there is always "an alteration in the bone marrow characterized essentially by the disappearance of the granular white cells", and that the syndrome which he enumerates "is the expression of a generalized lesion of the granulocytic apparatus".

After a careful analysis of his series of forty-three cases, Kastlin, as do subsequent observers, concludes that, with the evidence at hand, agranulocytic angina cannot be considered a definite and distinct clinical entity.

Diagnosis

This rests mainly upon the blood findings which show a marked reduction of or absence of polymorphonuclear cells, and a relative increase of the lymphocytes. Certain poisons, such as arsenic, benzol, and thorium, produce a leukopenia, and benzol attacks primarily the granulocytic cells. Acute leukemia may show a similar onset, and indeed it may be impossible to distinguish it from agranulocytic angina, but usually the blood picture will enable one to make the diagnosis.

Cases of sepsis have presented syndromes which were practically impossible to distinguish from this disease until they came to autopsy. In fact, Gamma[11] regards all the syndromes causing disappearance of granulocytes from the blood, as well as monocytic tonsillitis, as forms of sepsis.

Treatment

The treatment of agranulocytic angina, while hopeless in the early history of the disease, is now less discouraging. Local and systemic medication so far as reported seem futile, but Hoch[12] reports a recovery in a patient with a leukocyte count of only 1,200 following a transfusion of 500 c.c. of blood. Transfusions in all of the other cases I have seen reported, however, were unavailing. Friedmann[13] in his series of twenty-nine cases reports four recoveries following Roentgen raying of the long bones, a rational procedure in the light of our present view regarding the pathogenesis of the disease.

In reporting the one and only case I have see I do so with many misgivings; first, because I did not recognize the nature of the disease until six hours before the patient died; and because no necropsy was made which doubtless would have proved of great interest, especially in view of the almost sudden and unexpected death of the patient.

Mrs. B. A woman of culture and refinement. Age 51. Married. Has had two children, no abortions.

Family History.—Negative for tuberculosis, Bright's, cancer, and serious nervous or mental diseases.

Past History.—The patient was said to have had weak lungs in her early teens, and she

had a slight hemorrhage from her lungs about the time of the establishment of her menstrual period. She was always a slender girl and young woman and somewhat underweight until after her menopause, which occurred at forty-seven, and which was passed without incident; since that period she had enjoyed good health almost continuously except as about to be noted.

For the past two years she had recurring furuncles in her nose, and in the external auditory canal, and had perhaps a little more throat trouble than usual, and was advised time and again by her physicians to have her tonsils removed. She had frequent attacks of hoarseness and on this account had to give up her singing.

During two months before her last illness she spent most of her time nursing an invalid mother in the South, a ministration which made serious demands upon her strength. About two weeks before her last illness she had a slight irritability of the bladder and was given a prescription with instructions that if she was not relieved within a few days she was to report for a careful examination, which was not convenient for her to have made at the time. Two or three days thereafter she called over the phone and stated the symptoms had completely subsided and she felt perfectly well and would not report for further advice.

Present Illness.—On Sunday before her fatal illness the patient was seen at church and she remarked that she never felt better in her life. She retired Sunday night, December the eighteenth, in apparently good health. On Monday morning she awoke with a sore throat and consulted a specialist over the phone, who sent a gargle and asked her to report if she did not improve. Considerably improved, she spent much of the afternoon Monday shopping and felt quite comfortable on retiring. Shortly after midnight she was awakened with muscular pains, headache, and a very painfully sore throat. I saw her in the forenoon Tuesday and found her suffering with severe pain in her throat, with headache, and pains throughout all of the muscles and joints. Her temperature was 104½, pulse 120. The throat was markedly congested and the uvula slightly edematous, and she was slightly hoarse, a very common affection for her. There was no evidence of membrane whatsoever, but one was impressed with the fact that she had a very angry, painfully, sore throat; the tonsils being considerably swollen. A culture was sent to the laboratory of the King's Daughters' Hospital and the report was as follows: Pure culture of staphylococcus albus and the smear showed streptococcus, staphylococcus, pneumococcus and Vincent's.

The patient was given local applications of a 5 per cent solution of mercurochrome, and later irrigations of hot saline solutions were used. She was also given a capsule containing codein and aspirin for relief of pain. This was required several times during the first two days. I was very much surprised to find so small a dose of the anodyne relieved her pain.

On Wednesday morning she was more comfortable. Her temperature was 103 2/5, pulse 100 and of good quality. The appearance of her throat was but litle changed. There was some swelling of the glands at the angles of the jaws, but practically no tenderness. By Wednesday evening the patient was decidedly more comfortable and was asking to be up. On Thursday morning her temperature was 100 and her pulse was good. Her general condition in every way was satisfactory. On Thursday night she was seen about eight o'clock and I remained with her for half an hour. Her temperature was normal. Pulse practically normal. There was still fairly definite swelling of the cervical lymph nodes and the hoarseness persisted. There was at this time a very small gravish patch, scarcely noticeable, on the tonsils. The patient was in the best of spirits and spent much of the time discussing the holiday season and insisted that she must be permitted to be down stairs for Christmas dinner: in fact, she saw no reason why she might not be up on the following day. When last seen at eight-thirty, she was as bright and hopeful as one could possibly expect any patient to be, who apparently was recovering from a rather severe attack of tonsillitis and was insisting on being permitted to be up, and who was looking forward with the keenest delight to the Christmas season, only two or three days ahead.

Her condition was so satisfactory at eight-thirty Thursday night, it was not deemed necessary to see her so early on the following day as usual, and she was not seen again until noon Friday. Having had no communication from the sick room since the night before, the

announcement by the nurse at the door that the patient was worse and somewhat delirious was both unexpected and disappointing. Her mental condition had been perfectly normal, so far as I had known, up until this time. On entering the room I was inexpressibly shocked at the patient's condition. I cannot adequately describe the change that had come over her since leaving her the night before. Her expression was anxious, her breathing bad, her voice very hoarse, and there was a definite swelling of the neck, extending well over the front to the sternal notch. Her temperature at this time was normal. Her pulse was 100, but of a surprisingly good quality; the rhythm perfect, and the volume even at this time extraordinarily good. On examination of the mouth I found the following condition: The right tonsil was red and swollen with a dirty brownish exudate about the center extending on to the posterior pillar. The left tonsil showed a grayish ulceration over the lower pole, extending down into the epiglottic fossa and the upper portion of the membrane, extending toward the upper pole, was darker in color.

Later in the afternoon the swelling of the neck had increased with astounding rapidity and extended down and involved the upper portion of the chest. It was edematous, and in appearance and on palpation, somewhat suggested an emphysematous condition, but of course such was not the case Within two hours more there was a rapid development of tiny ulcers on the sides and under the tongue with marked swelling of the floor of the mouth, but there was little if any swelling of the tongue and no dribbling of saliva. The rapid development of the pathological condition was astonishing to each of the consultants.

While having had no personal experience with the disease, I was convinced at this time the patient was most likely suffering from agranulocytic angina and that I had not recognized it before. I at once communicated with her husband and expressed my worst fears and asked for consultation. Her specialist was called at once and, the Professor of Clinical Microscopy of Columbia University, being in the city at the time, was also called, and not only saw the patient with us, but checked up the laboratory findings.

The consultants regarded the case as probably one of Ludwig's angina. This diagnosis was made, however, before the laboratory report was available, which was as follows: "Throat smear shows Vincent's angina, diptheroid bacillus, streptococcus, and staphylococcus". Blood count: "Hemoglobin 70 per cent: Erythrocytes 5,760,000; Leucocytes 350; P. M. N. 0 per cent; S. M. N. 99 per cent; L. M. N. 0 per cent; Myelocytes 1 per cent".

In the light of such findings the diagnosis of agranulocytic angina was immediately concurred in. The blood culture was negative after twenty-four hours, but later showed streptococcus in the broth and staphylococcus albus in the agar. By three p. m. the patient's condition had become extremely grave. Her heart, which all agreed at one o'clock was not even needing stimulation but which was begun at once, however, showed evidences of failing. At five she was cyanotic and had an attack of almost complete syncope, and at six-thirty she suffered a sudden collapse and ceased to breathe. Except for a slight delirium in the earlier part of the day, she was conscious up until her last moments.

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Professional Building.

DISCUSSION.

DR. ALEX. F. ROBERTSON, JR., Staunton: Dr. Tynes has given us a most comprehensive survey of the literature and a very graphic report of a case of agranulocytic angina. Most of the cases from the literature seem to follow fairly consistently the original picture; that is, an acute, fatal affection occurring in middle-aged women, characterized by necrotic ulcerations of the throat and terminating in a picture which reminds us of septicemia. The etiology of the condition, as Dr. Tynes has said, is still in doubt. There is no specific organism which has been constantly isolated from the blood or from the internal organs. There are two theories as to the cause of the disease.

Whether the changes in the bone-marrow are due to a toxin elaborated by the throat infection, or whether the bone-marrow aplasia is the primary factor which lowers the resistance and allows the invading organism to become established in the throat, is undecided. Duke brings up a very interesting line of thought—that some of these cases of aplastic anemia affecting only the leukocytes are

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chronic and that the throat condition is a terminal condition.

I should like to say a word about the X-ray treatment reported by Dr. Freeman. He reports four recoveries, I believe, by exposure of the long bones to the X-ray. I should like to know the rationale of that treatment. It would seem that in a disease in which fifty per cent of the cases die within the first eight days the exposure of the long bones to X-ray would have an incidental rather than a therapeutic value.

The case I saw was in a middle-aged woman who was taken ill, while on a train, with fever, chill, and backache. She came home and went to bed and was seen by me on the third day. She had a throat condition which immediately suggested Vincent's angina or diphtheria. A throat culture showed the presence of Vincent's organisms; and she was immediately given arsphenamin, but without effect. The next morning the culture was negative for diphtheria. We at once thought of streptococcus infection; however, a culture never showed this. Her blood count on the seventh day was: Hemoglobin 60; erythrocytes 4,256,000; leukocytes 600; P. M. N. 0; S. M. N. 50; L. M. N. 50; blood culture sterile. Another blood count was made on the ninth day of her illness, the day before her death, and showed: Hemoglobin 55; erythrocytes 3,596,000; leukocytes 450; no polymorphonuclears; no swelling of the regional lymph nodes. Death occurred on the tenth day.

Dr. R. L. Payne, Norfolk: It has been my misfortune to see three of these cases, and I should like to detail briefly the last one I saw. A doctor was taken sick with sore throat. I saw him on the ninth day after he was taken sick. On the third day his local attendants lanced his tonsils for quinsy and evacuated pus. He improved somewhat but after the sixth day got rapidly worse. On the ninth day he was brought down to Norfolk by automobile to see if we could do something for him. He was then unconscious, had rapid pulse, Cheyne-Stokes breathing, and was anuric. The only thing I could get out of the local doctor's blood count was that he had no white cells at all. A blood count was immediately asked for, after giving the history of this other blood count. In a short time the head pathologist came down and told me she had been able to find only three leukocytes, after searching two slides. His condition was desperate, and he died in about six hours. The diagnosis, of course, was agranulocytic angina. The thing that impressed me about the whole problem is the point stressed by the essayist, that this is not a clinical entity but some severe form of intoxication due to more than one type of organism. I say this because in this case we cultured the streptococcus viridans from both nose and throat.

In these acute, overwhelming intoxications the white blood center is entirely crowded out; there are no white cells in the blood; and patients go down hill very rapidly when the myelocytic center in the marrow is put out by the toxemia.

Dr. Tynes, closing the discussion: In closing, I want to call attention to just one or two points and also to stress the fact that this patient had what appeared to be a simple tonsillitis, such as we see almost daily, on Tuesday, Wednesday, and Thursday; apparently a tonsillitis that gave every evidence of running a typical, ordinary course of a somewhat severe character and getting well. In fact, when I left her Thursday night I had not the remotest idea that the patient was afflicted with a fatal disease, and there seemed really no especial necessity for my returning the next day.

In one case reported in the literature the characteristic throat picture developed within three hours.

I wish also to call attention to the rapidity with which leukopenia may be produced experimentally. Following intravenous injections of protein, leukopenia of a profound character may be found within ten minutes. (C. K. Drinker, Oxford Medicine, Vol. II, page 562.)

HUMAN INFECTION WITH BRUCELLA MELITENSIS, VARIETY ABORTUS.*

By WALTER B. MARTIN, M. D., Norfolk, Va.

Malta fever has prevailed in the Mediterranean basin for centuries. In 1859 Marston differentiated this disease clinically from typhoid fever and malaria. In 1886 Bruce[1] demonstrated the specific etiological agent in the spleen of patients dying of the disease, and later was able to recover the same organism from the blood of living patients. Having observed it only in the coccoid form, he gave to the organism the name micrococcus melitensis.

In 1897 Wright and Smith[2] demonstrated specific agglutinins against micrococcus melitensis in the serum of certain patients and applied agglutination methods to the diagnosis of the disease. In 1905-1907, a commission appointed by the British government made an extensive study of the disease in the island of Malta, and was able to show that a large percentage of the goats in that region were infected with the organism of the disease, and that the infection was transmitted to man through the ingestion of raw goat's milk. Following their report the incidence of infection among British soldiers was tremendously lowered by the simple expedient of boiling the milk used by the garrison.

Craig[3] in 1905 reported the first case of Malta fever known to have originated in this country, but the source of infection was not determined and it is uncertain whether the case was of the abortus or the melitensis variety. Other cases had been previously observed in this country, but these had either originated among laboratory workers or were individuals who had contracted the disease outside the Continental United States. In 1911 Ferenbaugh,[4] and later Gentray and Ferenbaugh,[5] reported a group of cases originating in the goat raising district of Southwest

*Owing to author's illness, this paper was read by title at the fifty-ninth annual meeting of the Medical Society of Virginia in Danville, October 16-18, 1928.

Texas. In 1922 Lake[6] reported a group of thirty-seven cases occurring over a period of a few months in Phoenix, Arizona. This outbreak followed almost immediately after one of the local dairies began to market raw goat's milk on a commercial scale.

In 1897 Bang described the organism responsible for epidemic abortion in cattle, which he termed Bacillus abortus. Since then the wide distribution of this disease among dairy herds in this country has been repeatedly noted. Schroeder and Cotton in 1911 found the Bacillus abortus in eight out of seventy-seven samples of milk tested, and in the milk of six out of thirty-one dairy herds examined. Following this there have been numerous reports on the percentage of infection in market milk and dairy herds from several parts of the country. In most instances the percentages of infection are much higher than those noted by Schroeder and Cotton.

In 1918 Alice Evans[8] demonstrated the close biological kinship between bacillus abortus of Bang and the micrococcus melitensis of Bruce. So close is this relationship that she concluded that they showed less differences than individual strains of the meningococcus. More recently the same investigator has reviewed the whole subject at length.[9] In a careful, detailed study of many cultures from human, caprine, bovine, porcine and equine sources, she was able to classify them in eight serological groups not distinguishable by simple agglutination tests. Following the suggestion of Meyer and Shaw,[10] she applied the name "Brucella" to this group of organisms. Bang's organism thus becomes Brucella melitensis, variety abortus, and the micrococcus melitensis is classified as Brucella melitensis, variety melitensis. For sake of brevity, they will hereafter be referred to as Brucella abortus and Brucella melitensis, respectively.

Only a comparatively short time elapsed after the publication of Evans' work before the first case of human infection with the organism of epidemic abortion was reported. In the fall of 1922 Keefer[11] observed a case with a clinical picture of Malta fever. An organism repeatedly recovered from the blood stream of this patient was shown to belong to the abortus variety of Brucella melitensis. Since Keefer's report in 1924, human infection with Brucella abortus has become of increasing clinical interest. During the past four years forty-six additional cases scattered over fourteen states have been reported. It seems probable that the disease is more prevalent than is even yet recognized, and that many cases of so-called atypical typhoid and other continued fevers of unknown origin, if investigated by cultural and serological methods, may be proven to be the abortus type of Malta fever. In this connection Hardy's[12] report on epidemiology of undulant fever in Iowa is of especial interest. From December 1, 1927, to June 30, 1928, 1,120 tests were performed for both typhoid and undulant fever. Out of this group there were forty-seven cases of typhoid or para-typhoid fever detected and seventy-four positive cases of undulant fever. These were distributed almost uniformly throughout the State of Iowa.

As might be expected from the similarity of the two organisms, the clinical manifestations of disease produced in the human body by invasion of Brucella melitensis, of either the melitensis or abortus variety, are nearly identical in kind if not in degree. A review of the rapidly increasing group of reported cases of human abortus infection gives one the impression that the disease is on the whole milder than true Malta fever. Kampmeier[13] has recently reported three cases each of the bovine and caprine varieties and concludes that the cases of bovine origin are less severe. Evans[14] reviews two cases of abortus infection, and is impressed with the greater virulence of the strains infecting swine. The true clinical picture of the disease must, however, be based on multiple case reports from various sources, and it is for this reason that the following case records are presented. The disease is probably more prevalent in rural districts than in cities on account of the more general use of raw milk in the country. I am convinced that, if the physicians of this state become familiar with the clinical picture of the disease, and if, when they encounter suspicious cases they have the proper serological investigation made, the number of positive reports will rapidly increase.

Case 1.—M. L., male, age 47. Since adult life patient had been a strong, healthy man. He experienced four attacks of acute rheumatic fever during the period from 6-20 years. In 1899 he had yellow fever, and as a young man he had several attacks of malaria. There was

nothing in his past history that might have any bearing on his present trouble.

On January 1, 1927, patient had two infected teeth in the right upper jaw extracted and the sockets curetted. The wound did not heal and several small spicules of bone were discharged from time to time. Throughout January and February he did not feel well, and was unusually exhausted at the end of a day's work. In looking back it seems not improbable that he was running a low-grade afternoon temperature for a considerable time prior to his first examination on March 20. In the early part of February he developed an acute pain in the region of the left hip joint. The pain was quite intense but cleared up in a few days. On the night of March 18th he had a chilly sensation followed by rise of temperature, and a slight temperature persisted throughout the following day.

He was first seen on the 20th, and was then complaining of malaise and general aching sensation. About midnight of the 20th he had a sharp chill with rise of temperature to 103. The following day he was admitted to the Norfolk Protestant Hospital. His temperature and pulse on admission were each 100. The patient did not appear especially ill, and his physical examination showed nothing of importance. There was a moderate amount of nasal discharge with a little tenderness over the right antrum about the site of the infected tooth socket. He had a slight cough but no abnormalities were noted in the lungs. Blood pressure was 100/70. The spleen was not palpable, and there was no demonstrable enlargement on percussion. There was moderate tenderness in the left lower quadrant of the abdomen and patient complained of some pain in this region. Blood count taken on the 20th showed 4,000 white cells, of which only 27.5 per cent were polymorphonuclears and 58 per cent small mononuclears. Malarial parasites were not found. Haemoglobin was 93 per cent and red cells 4,850,000. Urine had a specific gravity of 1,030, gave a slight reducing reaction, and was positive for diacetic acid. Blood sugar was taken immediately and showed 176 mg. per 100 c.c. A second determination the following day showed 121 mg. per 100 c.c., and there was no subsequent rise of the blood sugar above this level. The urine on one other occasion showed a trace of sugar.

On the 25th of March, the Widal showed an agglutination of 1:40 against para-typhoid B. This was rechecked on the 30th of March and on the 18th of April with the same results. There was no agglutination of typhoid or paratyphoid A. Icterus index was 6, and serum bilirubin 1.7 mg. per litre. Repeated blood cultures were negative after ten days. X-ray of the lungs showed no pathology.

Patient remained in the hospital twenty-four days. During this time the white blood count varied from 4,000 to 7,600, with polys from 27-51 per cent and small mononuclears from 66-39 per cent. Except for one rise to 103 following the initial chill, his temperature never went above 101 2/5. Its principal characteristic was the complete absence of any regular pattern. He had no further chills but on several occasions chilly sensations. These always occurred at night, usually around midnight. There were occasional mild sweats; restlessness, nervousness and depression were quite marked. On the whole the patient slept well; his appetite was poor, his bowels constipated, and during his stay in the hospital he lost 12-15 pounds in weight. He was discharged from the hospital without any satisfactory diagnosis having been made.

Throughout the next month he continued to run a low-grade temperature, going as high as 100. Depression became more marked, weakness and loss of weight continued, and insomnia was more troublesome. Subsequent blood counts showed very little variation. Haemoglobin remained high, on May 6th was 96 per cent, white blood count 6,200 with 29 per cent polys and 60 per cent small mononuclears. On this date blood was sent to the Hygienic Laboratory with request for agglutination against the melitensis group of organisms. Positive agglutination of 1:1280 against both Brucella melitensis and Brucella abortus was reported. Agglutination absorption test, also carried out at the Hygienic Laboratory, showed the infection to be of the abortus type. Repeated agglutination tests during the following year are interesting. On June 21st agglutination was still 1:1280; on August 15th it had fallen to 1:320, but rose to 1:640 on October 14th. On November 25th it was 1:320, on February 23, 1928, was 1:160, and on June 16th was still 1:80.

The patient had no further febrile reaction until the spring of 1928, when he had temperature for a few days associated apparently with

an acute bronchitis. This subsided quickly, but he continued to feel badly and suffered severely from insomnia. During the fall of 1927 he developed a numbness of the fourth and fifth fingers on the outer side of the left hand. This was not associated with any pain. There has continued to be a moderate discomfort about the left hip joint, and recently there has been an acute involvement of the right subacromial bursa.

Case 2.—E. R. A., male, age 31. This patient consulted me on May 31, 1926, on account of cough and general malaise. General health had always been good. Fifteen years before he had had an attack of acute appendicitis, but the appendix was not removed. There had been no other acute illnesses of consequence. His present trouble began four weeks before with what patient considered was a mild attack of influenza associated with sore throat. Since then there had been a persistent cough of spasmodic character productive of a small amount of sputum. He had lost some weight and strength had become greatly impaired; night sweats were frequent. These were slight at first but later became very heavy, and patient thought they were associated with a peculiar odor. During this time he had one severe attack of epigastric pain. On May 17th there was a chill lasting five minutes. Since then he had had one other chill and several times he had experienced chilly sensations of brief duration. These usually occurred at night. Recently he had had severe and persistent headache. There had been considerable general aching and soreness, but no localized joint symptoms.

His physical examination showed little of consequence. There were some questionable teeth and dental films later revealed two apical abscesses. His tonsils were definitely infected. His lungs were clear except for a few scattered coarse rales and expiratory wheezes. The blood pressure was 140/90, pulse 90, temperature 99 3/5. The spleen was not felt. There was no evidence of joint involvement. Blood examination showed haemoglobin 97 per cent, white blood count 4,200 with 44.5 per cent polymorphonuclears and 40 per cent small mononuclears. The Wassermann was negative. Urine had a specific gravity of 1,020, but gave no abnormal findings. There was no agglutination with typhoid or para-typhoid A and B. X-ray of the sinuses revealed a slight clouding of both ethmoids. There was no evidence of pathology in the lungs. Two weeks later the white blood count was 2,400 with 40 per cent polys and 46 per cent small mononuclears. This patient gradually recovered and a diagnosis was not made.

In June, 1927, he had a recurrence of similar symptoms though of a milder character. He consulted another physician Dr. W. B. Newcomb, and at this time agglutination tests in the Hygienic Laboratory were positive for melitensis 1:640 and abortus 1:640. Agglutination absorption test proved the infection to be of the abortus variety. This patient since has had no further recurrence.

Case 3.—Mrs. T. L., age 22. This patient was seen in consultation with her family physician on November 8, 1927. She had been ill at that time nearly three weeks. Past history and family history revealed nothing that had any bearing on her present illness. About five weeks after a normal labor she began to feel badly, and it was noted she had daily afternoon rises of temperature. There were no rigors, but occasional chilly sensations followed by sweats. After the first week of illness the temperature rose regularly each afternoon to 103-104; there was general malaise but practically no other symptom. Patient did not feel very badly and said she wanted to get up. Throughout her illness she continued to nurse her baby and the infant remained perfectly well.

There was nothing in the patient's physical findings that in any way explained her temperature. The urine had a specific gravity of 1,030 and trace of albumen, but no casts or pus cells. Haemoglobin was 75 per cent, white blood count 4,700 with 40 per cent polys and 51.5 per cent small mononuclears. A Widal had previously been done and reported negative. This was repeated with entirely negative findings against typhoid and para-typhoid A and B. On the same day agglutination tests against the melitensis group showed agglutination up to 1:1280 against Brucella melitensis and 1:640 against Brucella abortus. This finding was confirmed by the Hygienic Laboratory, and agglutination absorption test proved the infection to be of the abortus variety.

It was not possible to make complete clinical observation on the patient on account of home surroundings. She gradually recovered, however, on symptomatic treatment and has

remained perfectly well since. It is of interest to note that the baby nursed the mother throughout the illness and remained well. I was very anxious to check the agglutination reaction of the baby's serum but could not get permission to take a specimen of blood. Ruddock[15] reports a similar case, a young woman with a three and one-half months old baby. The baby suckled its mother during the first five weeks of the disease without ill effect.

Case 4.—This record is presented as an unproven case. The evidence is only suggestive. A woman 44 years old was seen in consultation on July 4, 1928. She was complaining of nervousness, insomnia and rather indefinite pains in her limbs, especially about her knees. She had been in this condition for several months. Insomnia was very distressing, and had not yielded to any of the numerous sedatives used.

General physical examination revealed no significant abnormality. Her blood pressure was rather low for a woman of her age. There was a moderate anaemia of the secondary type. The urine was negative; Wassermann was negative. Questioning elicited the fact that about eighteen months previously the patient had visited in Southern Texas in a section where goat raising was a thriving industry. While there she suffered an illness with a prolonged irregular febrile course. Her local physician made a diagnosis of malaria, but it is not known whether the plasmodium was found in the blood. She was given quinine without checking the course of the fever. Quinine was not pushed, however, on account of some intolerance to the drug. After a rather prolonged febrile course, patient finally recovered and returned home.

On account of this history, serum was checked against Brucella abortus and complete agglutination at 1:40 and partial at 1:80 was found. The control serum was not agglutinated. I, of course, recognize that the diagnosis is not established in this case, but the history of prolonged irregular fever, symptoms presented of nervousness, marked insomnia and joint pain, together with agglutination at 1:80, is highly suggestive.

A consideration of the principal clinical features of the cases just presented may be of interest. In this connection I have reviewed the records of thirty cases previously reported in the literature by Keefer,[11] Gage and Gregory,[16] Carpenter,[17] Huddleston,[18] Hull and Black,[19] Belyea,[20] Willlams,[21] Ruddock,[15] Kampmeier,[13] Giordiano and Sensenich,[22] Magath[23] and Kerns.[24] The onset of nearly every case has been insidious, and it has been practically impossible to say just when the patient first became ill. While chills are frequent in this disease, they rarely occur as an initial symptom. The history is usually one of gradually increasing malaise. The patient complains of undue fatigue, of slight progressive loss of weight, generalized aching, loss of appetite, and chilly sensations. This slow course may be interrupted by a sharp chill followed by general aggravation of symptoms. Actual rigor may be absent, but chilly sensations or "cold spells" are nearly always experienced. Chills or definite chilly sensations are recorded in twenty-four out of thirty cases. It is interesting to observe that the chills quite frequently occur at night. Sweats have been noted in the majority of cases. The sweats may be very severe, and have frequently been described as drenching in character. In three cases in the literature and one of my own, a peculiar odor was noted at the time of the sweat.

Loss of appetite is usual and with it goes progressive loss of weight, often of a marked degree. Joint symptoms have been found in twelve cases; in most instances the arthritic changes were rather mild and fleeting, but in a few cases the involvement was so marked as to suggest an acute rheumatic condition. Cough was present as an early symptom in eight cases, and at times there was an associated bronchitis of a severe degree. Headaches of variable intensity were noted in twelve instances. Nervous symptoms are a frequent accompaniment of the disease, and are manifested by depression, irritability, restlessness and insomnia. They constitute one of the most distressing aftermaths, insomnia especially being a troublesome symptom long after the acute febrile period has passed.

The temperature course practically always shows the typical undulant curve so characteristic of Malta fever. Unfortunately, this is of more interest in retrospection than of real aid in diagnosis at the bedside. The most suggestive feature of the temperature course is its complete irregularity from day to day. Physical examination yields little of value from the diagnostic standpoint. The size of

the spleen was recorded in twenty-four cases, and in eleven of these it was not enlarged. Even though it is found enlarged, that fact helps us little as most of the conditions from which this disease must be differentiated are also accompanied by splenic enlargement.

Contrary to some of the statements in the literature, the blood picture may be of great diagnostic aid. Heiser[25] does not mention the white blood count in his description of Malta fever. Castellani and Chalmers[26] state that the white count is normal but that there is a reduction in the polymorphonuclears with an increase in the mononuclears. Craig[3] in 1905 in reporting a group of cases of Malta fever in this country thought there was a mild leucocytosis, and that this disease could be differentiated from typhoid fever on the basis of the white blood count. Watkins and Lake[27] in thirty-three counts on twenty patients give figures ranging from 2,800 to 11,800. In only five instances, however, was a count higher than 8,000 reported. The mononuclears varied from 28-62 per cent; in twenty cases the mononuclear count was over 40 per cent. In twenty-four cases collected from the literature in which one or more blood counts were made, there was a variation between 2,200 and 32,000. Eighteen cases had counts of 7,000 or under, and in only three cases did the count exceed 9,000. In the one case with 32,000 leucocytes, a count of 4,800 was subsequently found. In fifteen of these cases differentials were reported and the mononuclears were above 40 per cent at some time in all but three cases. In my own three cases the lowest counts were 4,000, 2,400 and 4,700, respectively, with small mononuclear percentages of 58, 46, and 51.5. I believe that some of the higher counts may be explained on the basis of complicating infections, especially bronchitis. I am of the opinion that counts taken fairly early in uncomplicated cases will in most instances show a definite leukopenia and a relative lymphocytic increase. Conversely, a blood picture of this type should immediately suggest Malta fever as one of the conditions to be considered in the differential diagnosis.

Final proof of the disease rests upon either the recovery of the Brucella abortus from the blood stream, or the demonstration of specific agglutinins in the serum of the patient. Methods of carrying out both of these procedures have been so well described by Evans[9] that it seems unnecesssary to outline them here. Attention is directed, however, to the fact that different strains of the melitensis group give a marked cross agglutination, and that they can only be differentiated by the agglutination absorption reaction. Francis and Evans[28] have further shown that there is frequently cross agglutination between strains of melitensis and bacillus tularense.

Human infection with Brucella abortus is to be differentiated from practically all conditions associated with long continued fever. Especially are to be considered typhoid fever, including the para varieties, pulmonary tuberculosis, general miliary tuberculosis, malaria, subacute bacterial endocarditis, and chronic sepsis. The clinical features and the usual laboratory procedures necessary for the diagnosis of the various conditions mentioned are too well known to require repetition. When one considers the slow onset of abortus infection, the irregular chills and malaise, joint symptoms, cough, sweats, loss of weight, long continued fever, together with the quite frequent finding of an enlarged spleen, it is evident that it may more or less closely simulate at times any one of this group of diseases.

Conclusions

1. Human infection with Brucella melitensis, variety abortus, is a disease indistinguishable clinically and by ordinary laboratory methods from the true Malta fever.

2. Case reports in increasing numbers indicate its widespread distribution throughout the country.

3. Positive diagnosis, while suggested by its clinical course, can only be made on the basis of positive blood culture or specific agglutination response of the patient's serum.

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FRACTURES AND THEIR TREATMENT.*

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In reviewing one's experiences during the past twenty-five years in the treatment of fractures, it impresses one with the great change which has taken place in our accuracy of diagnosis, efficiency of treatment, and our close attention to the ultimate results. At that time the X-ray was not in general use. Fractures would be tentatively reduced, immobilized over a considerable length of time, and it was not unexpected that joints adjacent to the fracture would suffer considerable limitation of movement, and a shortening of one and a half inches in the femur was regarded as an excellent result. Buck's extension, as we know now, imperfectly applied, was the usual treatment for fractures of the femur, with very occasionally the introduction of a wire or steel plate.

The war undoubtedly made more surgeons familiar with the treatment of fractures by suspension and proper traction, skeletal or otherwise, than anything else. It also impressed upon us the importance of minute attention to details, the importance of frequent checking up of the alignments of the bones by X-ray, and early mobilization of adjacent joints with the use of physiotherapy to hasten the return to functional activity.

The present industrial compensation law makes us more familiar with our late results by giving us the opportunity to estimate the percentage of permanent disability before a final settlement is made.

In spite of these advances, there are a great many surgeons who do not consider fractures important enough to give them their detailed attention. When one realizes that 60 per cent of the malpractice suits in this country are the results of fractures, it certainly indicates that this phase of surgery is not given proper study. Scudder, describing the work of the Fracture Committee of the American College of Surgeons, states that "it represents the organized effort of the medical profession to rectify the chaos existing in fracture treatment today". This Committee has since accomplished the introduction of a sixth requirement of all hospitals recognized by the College, namely, a minimum equipment to care for emergency treatment of fractures.

*Read before the fifty-ninth annual meeting of the Medical Society of Virginia, at Danville, Va., October 16-18, 1928.

We feel it is advisable, on every hospital staff, to have one man responsible for the treatment of fractures (charity patients) throughout the whole year. I have recently had the opportunity of visiting two city hospitals in cities of the Middle West. In one of these there was a rotating service in surgery. The results and treatment of the fractures which I saw were very unsatisfactory, the methods those in common use twenty years ago, and, on questioning the interne as to the use of skeletal traction, he replied he had never seen it used. In the other city, with one man in charge of fractures all the time, the results were eminently satisfactory and the methods of treatment were of the best.

The tendency of a great many men is to make a satisfactory reduction of a fracture, immobilize and lose interest,—forgetting the vastly more important steps that are necessary for an early return to functional activity.

In determining the treatment of any particular fracture, there are numerous things which must be taken into consideration. The age of the patient has considerable bearing, especially in the long bones of the lower extremities. Treatment of fractures in this locality in old age, adult life and childhood are vastly different. The amount of injury to the soft parts must be considered,—the liability of nerve injury, either from the original force producing the fracture or from subsequent compression of the nerve by callus. This latter is most frequently seen in the radial nerve in fractures of the shaft of the humerus, in the ulnar nerve in fractures of the elbow, and the anterior tibial nerve in fractures near the head of the fibula. The presence of arteriosclerosis, diabetes, anemia, syphilis and numerous other organic debilitating diseases would have considerable bearing on the prognosis and treatment of any particular fracture.

Fractures may be generally divided into three major classes: first, those which seldom or ever require open reduction, such as the clavical, metacarpals, metatarsals and phalanges; second, those which, in nearly all cases, require open reduction, as in fractures of the olecranon process and of the patella; third, the large class of cases in which one's best judgment must be exercised to determine whether the best results will follow open or closed reduction. Each case is a study in itself, and every surgeon who is treating many fractures is constantly shifting cases from the operative to the non-operative field and *vice versa*. I believe, with the modern methods of traction, there are now fewer fractures requiring open reduction than ever before, in spite of the fact that there is a greater tendency in some clinics to do primary open reduction.

The questions which must be considered in making a determination are: first, the length of time since the fracture occurred; second, the relative position of the fragments in regard to the main nerve and arterial trunks in that particular locality; and, third, the condition of the soft parts and which procedure most certainly will give an early return to functional activity, which is the ultimate goal. A layman, reaching a patient immediately after a simple fracture, may be able to make a more satisfactory reduction than a skilled surgeon is able to do a number of hours later. In fractures of the shaft of the humerus, the elbow joint and the head of the fibula, the position of the radial, ulnar and anterior tibial nerves must be considered with the relative positions of the fragments and whether or not a later excessive amount of callus may not cause compression with consequent paralysis of the parts supplied by these nerves. With considerable trauma of the soft parts and consequent lowered resistance to infection, open reduction should never be considered, nor should the position of the fragments of bones be ignored, as is so frequently the case. The applicaion of some form of traction can always be made, and immobilization obtained by this means in a modified Thomas splint will often produce good alignments and will enable one to treat an injury to the soft parts more satisfactorily. This is true, even if there is some evidence of injury to the blood supply of the extremity.

Many fractures that would first appear to be operative can frequently be reduced satisfactorily by gentle manipulation under the fluoroscope, and the bone held in apposition by properly applied external splints. It is especially true in the bones of the upper extremities. In fractures of the femur, I do not believe that one is justified in immediate open reduction, as alignment can be obtained and maintained, in a vast majority of cases, by skeletal traction, with the leg in a Thomas splint, an attachment for flexion of the knee and suspension from a Balkan frame. The weights by which suspension is maintained must be

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exactly coordinated to produce the best results, with the least discomfort to the patient, allowing early mobilization of the knee.

In fractures of the femur Orr uses a rather ingenious way of procuring constant traction. The patient is put on the extension table, anaesthetised, and traction sufficient to bring about the proper alignment of fragments is applied. Moleskin plaster is then applied from a point above the fracture to below the knee. Tape or rope is attached to the lower end of the plaster, a double spica is applied just below the knee, and the ends of the moleskin plaster are turned upward and embedded in the plaster cast. The cast is continued downward to include the leg and foot. When the traction force from the extension table is released there is very little danger of overlapping of the bony fragments, as the traction is maintained by the adhesive embedded in the plaster. Where open reduction is necessary, he uses the same procedure except that, instead of using moleskin plaster embedded in the cast, he uses ice tongs embedded in the condyles of the femur, and their position is maintained by the plaster cast. He reported results excellent.

Fractures of the long bones, if transverse, can often be reduced and locked; with proper external splints good union may be assured. In fractures of both bones of the forearm or leg, an effort should be made for proper reduction by manipulation under the fluoroscope. This can usually be accomplished. If not, fractures of the leg may be successfully reduced by applying Steinman's pin either through or above the os calcis, with suspension of the extremity and proper traction. The forearm more frequently requires open reduction. In compound fractures, without destruction of the soft tissues, if the case has been gotten early, it is very easy to enlarge the break in the skin and do an open reduction, locking the fragments in position. If apposition of the fragments is not obtained in the long bones in the first four or five days with properly applied skeletal traction and suspension, open reduction is necessary. It rests to a great extent upon the surgeon's experience as to whether he will use a bone plate and screw, intermedullary graft, steel screws, steel plate or wire. If the fracture is transverse and proper apposition can be obtained, no foreign substance need be left in the wound. Intermedullary bone graft is an excellent means of maintaining apposition, but there is danger of fracture of the graft. In certain oblique fractures the insertion of kangaroo tendon through holes drilled in the fragments maintains proper apposition. Others prefer wire, which should be removed in from three to six weeks. Plates properly applied in selected cases certainly give excellent results. Many surgeons, notably Sherman, of Pittsburgh, use these more frequently than any other means. They should be removed in from three to six weeks, and this can usually be done with local anaesthesia.

If, in the reduction of a fracture by traction, an effort is made to retain the fragments in apposition by constricting the injured extremity with a plaster cast, trouble will surely result. In the lower extremities constriction is usually applied above the knee and over the foot. If the fragments are in such a position that they tend to over-ride from muscular contraction, no plaster cast, properly applied, can prevent it.

What I wish to emphasize most particularly in this short review is the necessity of obtaining the proper position of the fragments as early as possible, either by gentle manipulation or skeletal traction, with the extremity properly suspended, the early mobilization of adjacent joints, and attention to minute details that would insure early return of functional activity, which is the ultimate goal. Traction in the majority of cases would be all that it necessary, but if reduction is not obtained in four or five days, do not wait longer before doing open reduction.

I have a few slides, taken from the fracture service at the Roanoke Hospital, which I will show you, illustrating the results from some of the methods enumerated in this paper.

1. This patient was injured June 20, 1928, by an automobile wreck. Was seen about three hours after the accident. As you see, he has an oblique fracture of the olecranon process of the ulna with forward dislocation of the elbow. Immediate open reduction was done and kangaroo tendon was used to hold the fragments in apposition. Good functional result.

2. This man stepped on a rock in getting out of the city patrol wagon. He fell, striking his left elbow, and produced this comminuted fracture of the lower extremity of the humerus, extending into the joint. Swell-

ing and injury to the soft parts was so extensive that no operative procedure was undertaken until two weeks after the injury, when open operation was done. The bones were found firmly held together and flexion was possible only to a right angle; the ulnar nerve was displaced from its normal position to in front of the internal condyle. At present he has flexion to a right angle and almost full extension. He is following his occupation on the police force.

3. This man, a bricklayer, had his elbow sticking out the window of a bus, when his elbow was struck by another bus passing in the opposite direction. This produced an extensive comminuted fracture of both bones in the middle of the forearm and a backward dislocation of the elbow joint. He was seen immediately after the accident, given an anaesthetic, and, under fluoroscopic vision, the fracture and dislocation were reduced by manipulation. At present, nearly three months after the injury, he is getting physiotherapy and apparently firm union is taking place, with good functional result.

4. This man was knocked from a truck by a street car, producing a crush fracture of the body of the third lumbar vertebra and an oblique fracture of the surgical neck of the femur. The upper fragment showed the usual displacement outward with external rotation. On account of the crush fracture of the lumbar spine, an effort was made at reduction on the traction table and a body cast applied, with the leg in abduction. Further X-ray showed the fragments in worse position than before. He was finally put up in a skeletal traction, with ice tongs, and a modified Thomas splint, with adjustment for flexion of the knee. He is at present carrying on his usual work. He had, at the last observation, between a quarter and a half inch lengthening.

5. This man was struck a glancing blow by an automobile, causing a fracture of the external tuberosity of the tibia, extending into the joint, and displacement upward of the fragment, which, in turn, displaced the femur inward. Under an anaesthetic the fragments were manipulated into position, as shown in the next plate. Perfect functional result. No evidence of lateral mobilization of the knee joint.

6. Occasionally a fractured patella is found in which it is unnecessary to operate. This slide shows a transverse fracture of the patella, with very little displacement, in a man sixty years of age. Immobilization for a limited time produced a perfect functional result.

7. An extensive comminuted fracture of the patella was produced by a sixteen foot fall. Immediate open reduction was done and a kangaroo tendon encircled the patella, bringing the fragments in as good apposition as could be expected. I undestand this man has good functional result.

8. This man had a comparatively short fall, producing an oblique fracture of the tibia, a fracture just below the head of the fibula and a longitudinal fracture of the lower extremity of the posterior surface of the tibia, extending into the joint. Reduction was attempted on the traction table and a plaster cast applied, but could not be maintained. I hesitated to use a Steinman's nail, due to the longitudinal fracture in the lower end of the tibia. Open reduction was done, and both kangaroo tendon and wire were used in holding the bones in apposition. The wire was removed, in my office, under local anaesthesia, six weeks after reduction. He is having physiotherapy used. He has a perfect anatomical result and I expect the functional result to be splendid.

9. This man was not seen until several days after the injury, when a plaster cast had been applied by another physician. As you see, there is a transverse fracture of the junction of the middle and lower thirds of the tibia and fibula with marked displacement forward of the lower fragments. Open reduction was done, and the fragments of the tibia were placed in apposition. No retention apparatus was used except a molded posterior plaster splint. Functional and anatomical results were perfect.

10. This man had a comminuted fracture of both bones of the leg from a motorcycle accident. Effort was made at reduction on the traction table and molded plaster was applied. Apposition was not obtained. St. Clair's skate was used without benefit. Finally, Steinman's nail was placed through the os calcis and reduction accomplished with firm bony union and good functional result.

11. This man was injured in an automobile wreck, which caused a compound fracture of both bones of the leg. The original wound was slightly enlarged, the bones put in apposition and a molded plaster splint applied.

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Union and functional results were good, and he has now returned to his previous occupation of bootlegging.

12. This slide shows a comminuted fracture of the lower extremity of the femur and the characteristic displacement backward of the lower fragment in a man 65 years of age. Ordinary traction method was used but without benefit. At the time the fracture occurred, we were not as familiar with what could be accomplished with the skeletal traction as we are today. A Laine plate was applied, as shown in this slide, with splendid results. To the same fracture today we would apply skeletal traction with the calipers placed a little bit anterior to their usual location, and reduction can usually be accomplished.

DR. JAMES CRAIK.*

By MAJOR GENERAL M. W. IRELAND, M. C.,
Washington, D. C.
Surgeon General, United States Army.

I presume that I have been invited to speak here today because of my connection with the medical service of the Army, the same service which Dr. Craik adorned in the days of our country's infancy.

A quiet, home-loving, modest man, James Craik is known to us mainly for two things, his army service and his intimate friendship with Washington.

His army service extended intermittently, as did Washington's, over almost half a century, beginning with the expedition against the French and Indians in 1754. He was then a resident of the present Winchester, a frontier town, and when a regiment was formed he was made its surgeon. He was 24 years of age and Washington, a young man, two years his junior, was the major of the regiment, later its commander. These two first met at Fort Necessity, and the friendship then begun lasted until death did them part, forty-five years later. Craik attended the wounded at Great Meadows and returned home with the Regiment. A year later, again with Washington, he accompanied Braddock's expedition, and attended that proud and stubborn man after he had received his fatal wound.

For gallant and meritorious service in battle, the Virginia Assembly, in August, 1755, awarded him a gift of thirty pounds.

In 1755, Washington was given command of the whole Virginia forces on the frontier, with headquarters at Winchester. Craik was his chief surgeon until the capture of Fort Du Quesne in 1758. After that he purchased a plantation at Port Tobacco, Maryland, and built himself a mansion, to which he took as a bride, in 1760, Marianne Ewell, great aunt of General Ewell, of the Confederate Army. There he lived quietly and practiced medicine until English abuses and colonial unrest under them disturbed the even tenor of his life. As early as 1774 he began to take an active part in the movements which led to the Revolution. In April, 1777, Washington wrote to offer him his choice of two positions. Craik accepted that of Assistant Director General of the Hospital for the Middle Department. The main army was there and, as Dr. Shippen, the Director General, remained in Philadelphia, Craik was the chief medical officer actually with the army. He was with Washington in all his battles from that time on. He saw Mercer breathe his last at Princeton, dressed the wound of Lafayette, at Brandywine, and was in charge of the hospitals at Yorktown. He was sent by Washington to organize hospitals for the French when they landed at Newport, and did it satisfactorily, despite dearth of resources.

In October, 1780, Dr. Shippen resigned, having been the third Director General to be tried by court-martial, being the third to hold the office. He was acquitted, but the other two had been dismissed. The Hospital (i. e., the Medical Department) was again reorganized. Washington recommended either John Cochran or James Craik to succeed Shippen. John Cochran also recommended Craik, but Congress chose Cochran. Craik became Physician and Surgeon General, which was second in rank. Thereafter the medical bickerings ceased. Craik's position still kept him with the army in the field.

When the Conway Cabal was forming against Washington, Craik warned Washington of it and named some of the plotters.

At the end of the War, Craik returned to his home at Port Tobacco, but, at Washington's request, he soon removed to Alexandria, to be near his great and good friend, and there practiced his profession until war with France threatened in 1798. Washington was called to

*Address given October 14, 1928, on the occasion of the unveiling of a monument to Dr. James Craik, in the graveyard of the old Presbyterian Meeting House, in Alexandria, Va.

command the Army which Congress had authorized, and he made it a condition that he name his principal assistants. For head of the Medical Department, he wrote, "I should prefer my old friend, Dr. Craik, who from forty years' experience is better qualified than a dozen of them together." Craik was commissioned Physician General, but before the army could be organized, the dispute was settled and the military establishment dissolved. Craik was not mustered out until June, 1800, although he had earlier retired to Virginia. There, in 1799, he was summoned to Washington's bedside, in what proved the latter's final illness. Much has been written in criticism of the treatment of Washington. We must temper our criticisms in view of the knowledge of the day. If we are to be blamed for not being in advance of our times, we shall all suffer. Washington was treated in accordance with the knowledge of his day. Bleeding was used for a vast number of diseases for almost a full half century after this. The teaching of America's leading medical man, Benjamin Rush, which influenced thousands, was powerful in its favor. Co-temporary criticism would perhaps have been greater had Washington not been bled at all.

Craik's grief for his loss, the loss of a great and dear friend, was profund and touching. "It seemed as if the bonds of my nature were rent asunder, and that the pillars of my country's happiness had fallen to the ground."

Dr. Craik survived his friend by fifteen years, "a stout, hale, cheery old man, perfectly erect, fond of good company and children, amusing himself with light work in his garden." He died at the age of 84.

It is interesting to recall that he was born in 1730 at a country place called Arbigland, near Dumfries, Scotland, and that the gardener on his father's place was one John Paul, to whom, when Craik was 17 years of age, was born that other John Paul who added Jones to his name and became one of the great figures in the Revolutionary cause in which Craik also labored. From there Craik went to Edinburgh to study medicine and get his degree. At the age of 20 he emigrated to the West Indies, and thence to America.

Few men have had or deserved a finer memorial than Craik has in the words which Washington wrote in his will, "My companion in arms, and old and intimate friend." No doubtful character was an intimate friend of Washington. When Washington Irving was seeking material for his life of Washington, he asked Lawrence Lewis to name some one who could supply material of an intimate nature. Mr. Lewis replied, "Dr. Craik was the only man, between whom and Washington there had always been unreserve and confidence." Let us leave him with the thought that he was a kindred spirit to the great and good Washington.

REPORT OF RECENT RESULTS IN RHINOPLASTY.*

By LEE COHEN, M. D., Baltimore, Md.

Our discussion this evening will not include consideration of those conditions wherein any loss of the soft parts of the external nose exists, such as is seen following gunshot and stab wounds, or after ulceration in syphilis, lupus and malignant growths. We shall instead confine our remarks to those deformities where the skin has remained intact, although in some instances scars induced by a previous injury causing the malformation may be present.

Such deformities are generally classified as congenital or acquired, but, in the opinion of the essayist, hard and fast lines cannot be drawn in this classification, since, for instance, many saddle noses of later life result from either septal abscesses or some injury during childhood which destroyed the centres of development and stunted future growth of the nose. Again, many of the over-sized noses in adult age unquestionably result from injuries in earlier life, no one of which was sufficiently severe as to cause fracture or septal abscess, but which by their repeated recurrence bring about hypertrophy of the bony or cartilaginous nose, or of both.

In several instances we have observed individuals who in childhood possessed a perfect nose, but which, from repeated blows received in baseball, basketball, boxing, etc., underwent such hypertrophic changes that by the time adult age was reached a grossly over-sized or hump nose had resulted.

Most so-called acquired deformities are in reality the result of injuries of such severity as to have caused at that time fracture and displacement of the nasal bones, with a resultant scoliotic or hump nose. At times, following

*Read at a staff meeting of the Gill Memorial Eye, Ear and Throat Hospital, Roanoke, Va., October, 1928.

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these severe injuries, more or less of the nasal bones is lost or destroyed, so producing a saddle nose, as will be seen in two of the cases to be shown tonight.

It is obvious that very little can be done in the prevention of those deformities actually of congenital origin, whereas much might be expected from prophylaxis in the acquired variety, if only fracture of the nasal bones were accorded the same immediate and painstaking care, when first seen, as is given to fractures of other bones of the body. It is a frequent experience of those engaged in this work to be informed by a patient seeking correction of a scoliotic nose—the result of a previous fracture—that the injury was at the time considered of little moment by his physician, who informed him that, "with the disappearance of swelling all would be well." It is to be hoped that the day is not far distant when all physicians will realize the fallacy of such advice, and, unless they themselves are capable of recognizing and managing these fractures—so often masked by the existing swelling,—immediately refer such patients to someone more experienced in this line of work.

The opinion frequently expressed, that it is best to await the disappearance of swelling of the soft parts before applying a permanent splint—recognized principle in management of fracture of long bones—is absolutely not in accordance with my experience in nose fractures. Much harm may be done by waiting, permitting the rapid formation of callus with more or less union in a faulty position, and necessitating subsequent refracture in order to obtain a satisfactory result. Immediate reduction of fracture, even when compound and requiring sutures for the skin wound, together with the application of a properly fitted and well-lined copper saddle splint, promises in every instance a perfectly straight nose. In an experience of many years this procedure has been routinely carried out, without a single untoward complication due to strangulation of tissue or to pressure induced by the splint.

Before attempting correction of any deformity of the external nose, rigid asepsis is of the utmost importance. This holds true also in the correction of recent fractures.

We first crop closely, with small barber scissors, all hairs within the nasal vestibule. The interior of nose should then be douched with at least a half gallon of sterile saline solution, and the vestibule cleansed with cotton swabs saturated with ether, the excess of which is carefully squeezed therefrom, to prevent discomfort from ether flowing over the nasal mucosa. Our next step is to pack the interior of the vestibule with cotton swabs saturated with alcohol, leaving them for about ten minutes. During this time the face should be well cleansed, first with soap and water, then with ether and alcohol. We discourage the use of iodine in the vestibule of the nose, because of skin irritation and discomfort which ha followed its use on several occasions. Since adopting this procedure of asepsis, not even a minor infection has occurred in our work.

Following asepsis, and next in importance, is anesthesia. Ether may be emloyed if desired in all cases. We find its use imperative, however, only in the successful setting of recent fractures and when rib grafts are required to build up the nose in correction of depressed deformities. In fractures where tissue resistance is already reduced by trauma, and if the fracture is compound, bacteria frequently gain access to the tissue, so that further traumatization by needle puncture in injecting novocaine is more likely to be followed by severe infection. Likewise, in rib grafts, liability of infection of the implant is greater in tissue traumatized by the repeated needle punctures. Then there is, of course, the greater ease in removing a graft from the side of a narcotized patient rather than from one under local, who is conscious during the procedure.

In the correction of all other deformities in adults, local anesthesia is employed, supplemented by the hypodermic injection of morphine, gr. ¼, atropine sulp. gr. 1/150 and scopolamine gr. 1/200, just before injecting the novocaine but after the cleansing up process is completed. Also, before injecting a 2 per cent novocaine solution beneath the skin over the entire nose—the needle being introduced from within the nasal vestibule,—the sensitivity of the nasal mucosa is reduced by spraying with one dram of a 5 per cent alypin solution, a little at a time, in installments three minutes apart. Twenty minutes should be consumed for this spraying process. Likewise, before injecting novocaine, the nasal cavities proper are shut off from the vestibule by packing with sterile ½ inch nu-gauze tape, over the front of which is placed a thin layer of cotton saturated with alcohol. Thus we suppress nasal

breathing and reduce the likelihood of wound infection to a minimum. Further shutting off the field of operation by covering all parts of the face and head with towels, and the mouth by several thicknesses of gauze through which the patient may breathe—a principle employed in all surgical procedures—is the final step preliminary to the operation itself.

Since time will not permit a full exposition of the subject of corrective rhinoplasty, several cases from our records, with pictures before and after operation, have been selected for discussion.

It should be mentioned, however, that many cases coming for plastic operation also suffer from nasal obstruction, and these conditions should always be remedied before proceeding with correction of the external deformity.

Case 1.—Before and after operation.

In order that many of the operative steps later referred to may be thoroughly understood, I should like, before taking up the various cases, to hurriedly show a few slides bearing upon the technique, although some of these have been before shown.

Case 1. L. M., female, age 22. In addition to the external deformity, complained of difficult nasal breathing due to septal deflection and hypertrophied lower turbinates. On October 24, 1926, a modified submucous resection was performed, both lower turbinates compressed, and their posterior pendulous ends removed with a snare. In previous reports I have detailed what is meant by "modified" submucous resection. It might again be mentioned that, in the modified submucous operation, the greater part of the triangular cartilage is preserved, in order to furnish the firm support absolutely essential in elevating the tip and shortening the nose, when subsequent correction of the external deformity takes place.

Six months later this patient returned for the plastic operation, although it could have been done one month after the inside work had it suited her convenience. Under local anesthesia, through incision within each vestibule along the edge of the pyriform opening, the entire skin over the bony nose was undermined. With a rasp, irregularities on the right side of the nose and the hump on the bony dorsum were removed, care being taken to so round the summit that the nose would not later appear broad and flat. A V-shaped section with apex at the anterior nasal spine and base 5 mm. in width beneath the nasal dorsum, just above the tip, was then removed from the subseptum and lower edge of the cartilaginous septum. The defect so created in the subseptum was then sewed with three black silk sutures through the skin and mucous membrane on each side of the septum, thus elevating the tip and shortening the nose. It was then seen that a slight depression of the dorsum had resulted at the junction of the bony and cartilaginous

portions. This depression was filled in by turning over the dorsum nasi, beneath the skin, two small triangular flaps, one from each side, cut from the edges of wounds in the alae which overlap when the tip is sutured upward. These flaps were left attached at their bases, adjoining the septum, and superimposed one upon the other. Unless such depression results, these small triangular portions of the alae are always exsected, so that the edges of the alae wounds nicely co-apt. By removal of these flaps the wings of the nose are shortened in proportion to the elevation of the tip. No sutures other than those in the subseptum were employed.

In late years we have relied entirely upon slinging the tip of the nose upward with adhesive strips to reinforce superficial sutures in the subseptum, instead of using the through and through deep sutures formerly employed, and find this method quite satisfactory. Packing of the nasal vestibule with ½ inch iodoform gauze tape, and application of the copper saddle splint, completed the operation.

This case is one of the simplest types of deformity which comes to us for correction. The packing was entirely removed at the end of the first week, but the splint was worn four weeks, being removed every three or four days for the purpose of bathing the skin with alcohol, to prevent irritation and formation of pimples.

Case 2. S B. Female, age 20, with grossly over-sized hump nose. Operation under local December 27 1927. Incisions and undermining of skin as in former case. The nasal bones were severed from their attachment to the nasal processes below, with the saw, and their attachment to the frontal bone above infracted. With a rasp, at least 5 mm. of the upper edge of each nasal process was removed, so that when the lower edges of the nasal bones were forced down in contact with the nasal processes, the plane of the dorsum and height of the bony nose was lowered 5 mm. Now, to shorten the nose, a V-shaped section, with base 6 mm. wide at the dorsum and its apex at the anterior nasal spine, was removed from the subseptum. To further mobilize the bridge of the nose, and at the same time lower the plane of the cartilaginous dorsum, a triangular strip was removed from the entire septum just beneath the nasal dorsum. This was accomplished with the Struychen scissors, after undermining the mucous membrane on each side of the septum from the subseptal wound up to the frontal notch. The base of this triangular strip of septum was 6 mm. wide and located below, at the subseptal wound. Suturing of the subseptal wound elevated the tip and shortened the nose. Then, by removal of the overlapping edges of the wound in each ala, the wings of the nose were shortened in proportion.

Five months later a bit of callus developed on the bony dorsum and caused a slight hump. This was removed, under local, with a rasp, causing but slight inconvenience to the patient, with the result as shown in the photograph.

Case 2.—Before and after operation.

Case 3. R. S. Female, age 30. Over-sized hump nose. The tip drooped markedly and the columella protruded so far below the edges of the alae that the large nostrils were strikingly evident.

On March 1, 1928, under local, the irregularities and hump on the bony dorsum were removed with the rasp, the nose shortened and the tip elevated, by removal of a subseptal section 8 mm. wide at base, along with sections of corresponding size from each ala. The cartilaginous nose was now much too broad, but fearing that further excision might so impair the circulation as to bring about a subsequent sloughing of tissue, we concluded to make this correction at a subsequent sitting.

in Case 2, and place it on an even plane with the bony dorsum above.

There now remained but the undue width of the cartilaginous nose to be corrected, and this was accomplished by removing, with scissors, a 5 mm. strip from the cartilaginous dorsum, on each side of the septum, extending from the subseptal wound upward to the bony nose. Four sutures on each side were used to close the subseptal wound, the two upper ones, which passed through the cartilaginous septum above, furnishing a firm anchorage for the nasal tip. Packing of the vestibule in this case was exceedingly light, so that pressure made by a very snug fitting saddle splint might, by compression, hold the edges of the

Case 3.—Before and after operation.

To suit convenience of the patient, the second operation was not performed until six months later—on September 11th. At this time the subseptum was transfixed with the straight double-edged pointed knife, incised from the anterior nasal spine just above and along the columella, curving upward beneath the tip to the cartilaginous septum. The nose being short enough, no segment of tissue was removed, but this incision so mobilized the tip that it could be placed on any desired plane. The incision also furnished access to the lower edge of the cartilaginous septum, from where we could conveniently reduce the height of the cartilaginous nose in the manner just described

dorsal defects in apposition without sutures.

The splint was worn four weeks, while packing was removed at end of the first week, with the excellent result here shown.

Case 4. S. J. G., female, age 24. This case presents many points of interest. She was sent by a very able internist, from a neighboring city, on May 28, 1928, for the correction of a saddle nose caused by an automobile accident four years before. The doctor reported also that she had been a carrier of streptococcus viridens for ten months, following an attack of acute articular rheumatism which confined her to bed for three weeks, but from which she recovered without any cardiac complica-

tion. During this period repeated cultures from her nose and throat revealed the persistent presence of streptococci, but frequent blood cultures had failed to show any bacteremia. Leucocytosis of from 14,000 to 16,000 was shown in every blood count, and the patient ran a low grade temperature of from 99.5 to slightly above 100 each evening; also she complained of vague rheumatic pains about the body and extremities. She was depressed, wholly devoid of energy, and was able to carry on her work as a trained nurse only with the greatest effort. The laboratory findings were confirmed by Dr. Judd, of Baltimore.

We hesitated, of course, to do anything surgical until she was rid of the bacteria in her nose and throat. Treatment to accomplish this was begun immediately and consisted of douching the nose and throat twice daily at the office with sterile saline solution, followed by liberal spraying with hexyl-resorcinol in full strength. This was supplemented by use of toothbrush five times daily at home and freely gargling the throat, after each ingestion of food, with normal salt solution, followed by half strength hexyl-resorcinol. To improve her physical condition, she was directed to spend all possible time in the sunlight, to take extra milk and eggs, and to drink not less than ten glasses of water daily. In three weeks the patient, was not only fever free and subjectively greatly improved, but cultures from the nose and throat were free from streptococci. Local treatment was now discontinued and several days allowed before taking final cultures which were found negative.

We now felt that surgical measures could be safely instituted. Fourteen years before this, some sort of intranasal operation had been performed, and tonsils removed; seven years later, a submucous resection had been performed, without, however, bringing relief for her nasal obstruction. We found the upper and back part of the nasal septum so markedly deflected toward the right that it was in contact with the outer wall of the nose. A perforation of the cartilaginous septum about the size of a dime, high up and close to the vomа, was also present. Externally, we had a typical saddle nose, with absence of the entire right nasal bone, while the edge of the left nasal bone could be sharply felt beneath the skin. History revealed that the right one had been removed when first aid treatment was rendered following the automobile accident.

Case 4.—Before and after operation.

On July 3, 1928, the septal deformity was corrected by submucous operation, but closure of the perforation was not possible owing to the thinness of the septum at that point; besides, being situated so far back and high up, we felt that with a straight septum scabs would not likely form on its edges, and the patient would not be inconvenienced by it. Time has shown this to be true. Healing was uneventful

ful after this inside operation, and the patient felt so well that ten days later we were able to proceed with correction of the external deformity by a rib graft operation.

Before correcting any saddle nose with rib transplant, we find it absolutely essential to have some accurate way of determining the size and shape of the implant to be inserted. It has been our custom to build up the depressed nose with dental wax placed on the dorsum until in size and shape it is in keeping with the facial symmetry. This wax impression is then sent to a dental laboratory, and from it is made a metal model which can be boiled with the instruments.

Case 5.—Before and after operation.

After preparing the nose for reception of the graft, the metal model is slipped under the skin, and we are thus given an accurate impression of what the result will be. Should the nose appear a trifle too high or low, the shape of the graft may be made to differ from the model accordingly, but generally the metal model offers an accurate guide for shaping our graft, and obviates the necessity of removing the implant to change its shape, once it is placed in position. This is important also because the likelihood of graft infection is increased in direct proportion to the amount of unnecessary handling to which it is subjected.

On July 13, 1928, under ether anesthesia, after undermining the skin over the nose in the usual way, the projecting upper edge of the left nasal bone was lowered with a rasp, so that the dorsum of the nose was of even height on both sides. Aftery trying the metal model under the skin, a mixed bone and cartilage graft was removed from the seventh rib of the right side and trimmed to the shape of model. The graft was then slipped under the skin of the dorsum, bony portion upward, so that its end would rest in contact with the frontal bone. Incisions within the nose were sutured with black silk, the vestibule packed with iodoform gauze, and a splint applied tightly enough to hold the implant snugly against the underlying bone.

To the use of this splint we attribute our satisfactory cosmetic results and the prevention of absorption of the bone grafts, since without the firm pressure exerted by it the bony surfaces cannot be kept in contact, nor can bony union be expected between the graft and the underlying nose. Without such bony union absorption of the graft is sure to occur. How results can be expected from the simple placing of adhesive strips over the nose, so commonly done, is beyond my comprehension.

It might be mentioned, as explained in previous papers, that the graft must not be touched with the fingers, gloved or ungloved, but should either be held with forceps or in sterile gauze, to avoid any likelihood of infection.

Packing was removed on the third day after operation, stitches from the side wound and

from within the nose at the end of a week. All wounds healed *per primum*, and the patient was able to leave the hospital on the eighth day. Splint was worn three weeks. Since the operation this young woman has been a changed person. She has had no recurrence of the bacteria in the throat, her body weight has increased, and with the joy of her improved appearance all signs of depression have vanished.

Case 5. W. P. Male, age 42, had been rather bad health since 1907, when he had sustained an injury from the explosion of a muzzle loading gun while shooting game. The breech bolt, 2 inches in length, struck the patient squarely in the nasal notch, practically destroying both nasal bones. This bolt passed through the right nasal chamber just beneath the glabella, entering the right orbit, from which it was subsequently extracted. The injury to the right eye necessitated enucleation, and, as you will observe from the photograph, when healing took place, the inner canthus was bound down to the bone a full centimeter below the level of that of the left side.

Aside from the external deformity, the patient complained of constant inability to breathe through the nose, frequent colds and acute tonsillitis, together with intolerable headaches. Inspection of interior of nose showed both nasal fossae practically blocked by a distorted and displaced septum, along with much callous formation, as a result of the injury to the bony septum. Viewed externally, there was practically no bony bridge to the nose. A crucial scar crossed directly in the nasal notch. The upper short arm extended over the glabella more than a half inch and the lower arm about 1½ inches in length, faded off the left side of the nose on to the cheek. This scar was intimately adherent to the underlying bone and offered great difficulty in undermining the skin at the time of operation. We have observed in many instances that scars which were quite evident before the plastic became contracted after undermining of the skin, and often were scarcely visible after healing took place. While the broad and dense scars may still be noticed, they also generally become so inconspicuous after undermining that excision of scars in these cases have in no instance been found necessary.

Our first problem was the establishment of free nasal breathing, and removal of diseased tonsils. This was accomplished on March 31, 1928. The septal deformity was corrected by submucous operation, and both lower turbinates were reduced by compression and snaring away the pendulous posterior ends. At the same sitting, but under ether, both tonsils were removed. During the following six weeks the patient's general health improved so greatly that on May 15, 1928, a rib graft operation was performed to correct the saddle nose.

You can readily see the improvement already achieved, and when a little later the displaced eye-lids are restored to their normal position by a plastic operation, his appearance should show further marked improvement.

1820 *Eutaw Place.*

STONEWALL JACKSON'S SURGEON.*

By CHARLES O. DEARMONT, M. D., White Post, Va.

On October 11, 1835, in the City of Winchester, Va., there was born a child who was destined, both through birth and training, to leave his impress upon the world. He was named Hunter Holmes McGuire, being the son of Dr. Hugh Holmes McGuire and Eliza Moss, of Fairfax County, Virginia. His veins were filled with Irish blood, his ancestors having come from the County of Fermanagh, Ireland,—and, while I am not sure, I would hazard the guess that he had some Scotch blood in him also.

Hunter McGuire was trained at the old Winchester Academy, where his father before him had first learned the three R's. Having completed his academic education, we find him enrolled in the Winchester Medical College, an institution composed of a few celebrated physicians of Winchester and Clarke County, his father being the founder and a professor in it. From there he went to Philadelphia, where his medical education was completed.

Returning to his native city, he was made, at the age of twenty-one, Professor of Anatomy in the Winchester Medical College, where he taught for two years. We next find him back in Philadelphia, associated with two eminent physicians, Drs. Pancoast and Luckett, conducting a Quiz Class. The fact that Drs. Pancoast and Luckett would have so young a man as their associate in teaching is enough to stamp Dr. McGuire as an outstanding figure in melicine; but the incident that is soon to

*President's Address read before the Medical Association of the Valley of Virginia, at Harrisonburg, Va., May 31, 1928.

follow is, in the opinion of the writer, the one that makes him stand out in bold relief.

About this time, or a little earlier, an old so-called "clock-fixer" had invaded our Southland and become active in Virginia, mending clocks (supposedly), and the result was . . . John Brown's Raid. I dare say nothing could have enraged the South more. You can imagine how the blood boiled in the veins of those Southern students in Philadelphia. Feeling was at its height, and I can imagine speeches, *pro* and *con*, were made by these students. In the midst of the turmoil we find young McGuire, and at the head of three hundred students, leading them Southward, never stopping until they landed in Capitol Square, Richmond. The Governor of Virginia made a speech, lauding Dr. McGuire for this feat. The students enrolled in the Medical College of Virginia, where they could give vent to their feelings, as well as prosecute their studies in a more favorable atmosphere. McGuire leaves them there, and goes to New Orleans to practice his profession, but fate did not permit him to remain there long. The fires are being kindled, the match is struck, and that shot at Fort Sumter has sent its echo around the world.

Winchester organizes its first volunteer company, and we find Dr. McGuire a private in the ranks. Was he to remain a private long? No longer than the eagle eye of Stonewall Jackson spied him. Jackson soon made him Medical Director of his army—over many older and more experienced heads. Dr. McGuire, recognizing this fact, protested to his general; to which Jackson replied, "Sir! I appointed *you*". This position he held with conspicuous merit until that fatal stroke at Chancellorsville, which staggered the Confederate cause. It was most befitting that Jackson should give his last command to his Medical Director. While his arm was being amputated, the wounded general said, "Dr. McGuire, do your duty".

No official report of battle by General Jackson fails to record some acknowledgment of Dr. McGuire's skill and service. He was not only Jackson's surgeon, but his trusted friend as well. His records prove the trust and confidence he had in him. Was the feeling mutual? Listen to these words, spoken at the unveiling of Jackson's monument in Lexington. "The noblest heritage I shall hand down to my children is the fact that Stonewall Jackson condescended to hold me, and treat me, as his friend."

After Jackson's death, Dr. McGuire was made Medical Director of the Second Army Corps, which position he held until the curtain was drawn at Appomattox. He developed remarkable administrative and executive ability, all of which is proven by the same expressions of approval by the commanders of the Second Army Corps. Dr. McGuire's genius was recognized by friend and foe alike. An authority from Boston says, "He humanized war by originating the custom of releasing all medical officers immediately they were captured". The credit also belongs to him for organizing the Reserve Hospital Corps of the Confederate Army, and perfecting the Ambulance Corps.

After the close of the war, Dr. McGuire settled in Richmond for the practice of his profession. He was soon elected to fill the Chair of Surgery in the Medical College of Virginia, which position he held until 1878. Realizing the necessity of a hospital to take care of the growing demands of his practice, he organized, in 1883, Saint Luke's Home for the Sick, with a training school for nurses. This continued to grow, until 1899, when he had to rebuild, what is now Saint Luke's Hospital.

Dr. McGuire's ability was recognized in peace as well as war, and honors came thick and fast. In 1870 he helped to found the Medical Society of Virginia, and was, for several years, chairman of the executive committee. In 1880 he was made its president. In 1869, he was made president of the Richmond Academy of Medicine; in 1875, president of Association of Medical Officers of the Army and Navy of the Confederate States. In 1876, he was vice-president of the International Medical Congress. In 1887, the University of North Carolinia conferred upon him the degree of Doctor of Laws. In 1888, the Jefferson Medical College of Philadelphia did likewise. In 1889, he was made president of the Southern Surgical and Gynecological Association. In 1893, he was made vice-president of the American Medical Association, and, in 1896, its president. In 1893, with his usual keen insight and broad vision, he saw the need for a more modern and better equipped medical school, and from this sprung the

University College of Medicine, he being its president up to the time of his death.

I have written much about Dr. McGuire, the Medical Director of the Army, the Administrator, the Executive; but there is another side to him—his sense of right. He had no patience with distorted facts. When Northern historians sought to becloud the minds of the children of those who wore the gray, it aroused all the fighting blood in him, and to him, more than any other man, belongs the credit of purging our schools of those histories, and securing in their stead books written by unbiased minds. He inaugurated the movement and was chairman of the committee.

Dr. McGuire's name was a household word throughout the South, and he never forgot his comrades. An old Confederate once told me this story; Dr. McGuire was once asked what he would charge to operate on an old soldier for a certain ailment. His reply was, "I haven't gotten low enough yet to charge an old Confederate soldier".

He was considered the third surgeon of the world, and was a pioneer in his field. All of us have read his treatise on gun shot wounds of the abdomen—a standard article in many works on surgery. While his contributions were not voluminous, he was a forceful writer, a clear thinker, and his words, few but well chosen, always carried conviction. As a teacher he had the gift of imparting knowledge. His diagnostic acumen was almost uncanny. As an operator he was most dexterous. He used to say, "Cut everything in front of you, and tie everything that spurts". How many of you who see the old "prostatic" remember that it was Hunter McGuire who first brought relief to him by doing the suprapubic cystostomy, and it may be of interest to you to know that, in conjunction with Sayre, of New York, he made and used the first plaster of Paris cast for Pott's disease of the spine:—Dr. Stuart McGuire wore the first one. He and Sayre were great friends. A strange coincidence—their deaths occurred but a few hours apart.

From my description of him, you may form the opinion that he was a stern, military figure, and, perhaps, in war, rightly; but in his ministrations to the sick he was as tender as a mother, and his kindness to the poor is best described by quoting his one-time bookkeeper, who said, "Often, in making out the bills, he would say, 'Don't send that bill. She is a poor woman.'" Once a *small* doctor in the Academy of Medicine criticized him for not charging a poor person enough. He replied, "Damn the Academy of Medicine. If a poor woman comes to me for relief, I am going to give it to her".

To say he was held in deep affection by his people, expresses it but feebly. When the silent reaper struck his first blow, every church, every creed in the City of Richmond offered up prayers for his recovery. And shortly after his death, which occurred September 19, 1900, a memorial association was formed, and voluntary contributions poured in to erect a suitable monument to his memory, so fast, and without solicitation, that within a year a statue was erected in Capitol Square, Richmond, close by the side of his beloved Jackson—a most suitable place.

THE INFLUENCE OF PHYSIOLOGIC RESEARCH ON MODERN SURGERY.*

By J. SHELTON HORSLEY, M. D., Richmond, Va.
(From the Surgical Department of St. Elizabeth's Hospital).

It seems appropriate in the tercentennial of the publication of the classic monograph by William Harvey on the motion of the heart and blood in animals not only to review the advance made in physiology as a science but to emphasize the important influence of this advance on clinical medicine and surgery. It is not possible within the limits of an address even to mention the numerous instances by which the conceptions of disease and the methods of treatment have been directly or indirectly influenced by some research in physiology. Researches of this kind are not necessarily always in a laboratory on experimental animals. Careful clinical observations are sometimes capable of evolving new biologic principles. This has been notable in the life of the late Sir James MacKenzie, who, in the isolated Scotch village of Burnley, and with no training other than that of the average medical student of his day, solved many of the perplexing clinical problems concerning the heart, contributed greatly to a physiologic knowledge of the normal function of the heart, and made interesting observations on pain.

There is no work on pain that does not profoundly affect clinical medicine in all of its branches. Much remains to be known of the

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cause and distribution of pain in the sympathetics and in their connections. Observation of the very early stages of a disease and deductions made from cases accurately studied, doubtless will prove of value in determining the distribution and cause of pain in this disease.

Homer Swift says that all medicine is in a sense experimental. "By this it was meant to imply that it is necessary for the physician, whether in the laboratory or at the bedside, to approach his problem from the experimental viewpoint. Only by postulating that we know all about a disease or all about a sick man dare we conclude that we have the necessary knowledge which will enable us to control all the symptoms, that is, the phenomena of disease. No one would be so rash as to claim such knowledge. Why, then, should he be so bold as to approach either a sick man or the problem of disease in any attitude but that of the scientist?"

Disease, according to Professor C. A. L. Evans, is a departure from normal which threatens life or which in some way reduces its value. The symptoms of the disease are sometimes due to a cessation or an increase of function, or to an adaptation of a compensatory nature. These may be atrophy or hypertrophy of an organ, as a decrease or an increase of function. A study of this function often may be carried on clinically, but the fundamental basis in many instances now, as formerly, depends upon experimental research. William Harvey said, "At length, and by using greater and daily diligence, having frequent recourse to vivisections, employing a variety of animals for the purpose, and collating numerous observations, I thought that I had attained to the truth, that I should extricate myself and escape from this labyrinth and that I had discovered what I so much desired, both the motion and the use of the heart and arteries."

It is difficult to disassociate art and science in medicine or surgery. They blend into each other. The mechanical and technical procedures in surgery, the taking of a history and obtaining physical signs, may be called an art, but the proper interpretation of the condition of the tissues, the correlation of the history and the clinical findings secured by palpation, inspection or auscultation into a logical diagnosis and the application of this knowledge to the treatment of the case, involves a mixture of science and art that is too intimate to unravel.

The instances of clinical disasters that have occurred from ignoring physiologic function are unfortunately numerous. The days when the ovaries of women were removed for a slight pretext, such as dysmenorrhoea, menorrhagia or metrorrhagia, headaches, backaches and various groups of nervous symptoms, have passed. These operations often left in their trail nervous wrecks whose lives were more miserable after the operation than before, the remedy being far worse than the disease. In more modern times the excision of the colon to cure various troubles, from goiter to chronic cystic mastitis, has also had its vogue, but has happily been abandoned for such purposes. The repair of defects in the palate by turning in large flaps of tissue without considering the function of the muscles of the soft palate may result in a mechanical occlusion of the cleft, but the possibility of function of the muscles has too often been thereby destroyed. The setting of fractured bones with large metal plates tends to retard bony healing, because it is based chiefly on mechanical concepts, repairing bone as a carpenter would mend a piece of broken timber, without regard to the fact that foreign irritating substances in bone cause an osteoporosis. Frequently Nature's abundant efforts have prevented failure of union by throwing out a sufficient amount of callus in the bony tissue at a distance from the plate. Recently certain operations upon the sympathetic system have often afforded relief of pain, but undoubtedly many operative procedures in this field have been undertaken on too little physiologic basis.

The problem of the application of surgery to the gastro-intestinal tract is always a pressing one because such opportunities are abundant. No longer does the surgical treatment of every lesion of the stomach consist in doing a gastroenterostomy, though this operation has a distinct and wide field in properly selected cases. It remains to be seen whether the swing to the other extreme of extensive sub-total gastrectomies for even a small duodenal ulcer will prove satisfactory. Certainly the abolition of all acid gastric secretion for the cure of a comparatively small lesion cannot always be considered a desirable thing. Aside from its role in digestion, the antiseptic effect of hydro-

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chloric acid is marked. While the gastric juice is not as important as it was formerly considered, it is probable that the deprivation of a large amount of healthy gastric tissue is not consistent with normal health in all patients. It would seem more logical to make the operation fit the pathology, rather than to adopt a standard method of procedure for every lesion. The failure to cure by gastroenterostomy when applied indiscriminately to all gastric lesions would doubtless also appear when all gastric lesions are subjected to a far more radical operation. That there are certain instances in which radical operation is indicated is, of course, obvious. It would seem preferable to perform a less extensive operation in mild cases, preserving as far as possible physiologic function, with the knowledge that a small percentage of these cases will have a recurrence of the ulcer, than to undertake the radical operation in the first instance in all cases. The radical operation can then be applied to the small percentage of recurrences.

It has been shown by Ivy and Farrell that the secretion of gastric juice is stimulated by some material circulating in the blood. In a female dog, Ivy transplanted a portion of the stomach to tissues beneath the mammary glands doing the operation in stages in order to develop a blood supply to the transplant. When the transplanted part of the stomach had been disconnected, it was found that feeding the dog normally would produce from the isolated pouch a certain amount of secretion of gastric juice containing hydrochloric acid and pepsin. Of course there are other stimulants for gastric juice besides this, but the determination of a humoral stimulant for the hydrochloric acid in the gastric juice is also interesting from a clinical view, as many diseases are accompanied or preceded by achlorhydria, and it seems that they may in some way destroy or neutralize this normal blood stimulant.

The absence of hydrochloric acid in the gastric juice for a long period of time is undoubtedly a potential handicap to health even though apparently there may be no symptoms. Donald R. Black has found that from 7 to 10 per cent of routine gastric analyses show achlorhydria. It has long been known that achlorhydria is present in pernicious anemia, and that it precedes the typical blood findings of this disease by months and sometimes by years. Such other diseases as anorexia, abdominal distention, diarrhea, urticaria, arthritis deformans, and myocarditis have been attributed to achlorhydria, and yet they are often found in patients whose gastric secretion is normal. The association of sclerosis of the spinal cord with achlorhydria has been particularly striking, as this disease has often been found to accompany pernicious anemia.

The absence of hydrochloric acid in the gastric juice permits the accumulation of bacteria in the upper intestinal tract. In cancer of the stomach the achlorhydria is a marked feature. In operations upon such cases the risk is distinctly greater because of the possibility of sepsis from the stomach, whose normal acid gastric secretion would have a marked antiseptic effect.

Following the suggestion of W. H. Higgins, attending physician to St. Elizabeth's Hospital, we give dilute hydrochloric acid in cases of cancer of the stomach before an operation. In order to insure a fairly constant supply of free hydrochloric acid in the stomach, six drams of the official dilute acid are given in three pints of water daily for two days prior to the operation. Small quantities of this solution are taken hourly, and not as usually prescribed after meals. In cases of pyloric obstruction frequent lavages with 0.5 per cent hydrochloric acid may be substituted. In conditions in which surgery of the upper intestinal tract may be anticipated for a few days, this procedure would tend to lower the bacteria in the intestinal contents and even after emergency operations on the upper intestinal tract it may be advisable to administer hydrochloric acid in this manner.

The majority of gastric symptoms are due to a derangement of the motor mechanism rather than of the secretory apparatus. Walter Hughson, of the Johns Hopkins Hospital, has shown that in dogs there is a tendency to pyloric spasm following an injury to the peritoneum. This is a reflex spasm and the paths for this reflex are are through the vagus nerve. After inducing the spasm and delayed emptying of the stomach by creating a lesion in the colon, he has caused normal emptying by resecting the vagus nerve, and finds that removing the branches of the vagus about the middle of the stomach where the vagus is more accessible has the same effect as when the nerve is severed immediately on entering the stomach. In some instances, particularly in connection

with other operations, this procedure has a field. That it permits a quicker emptying of the stomach and regurgitation of the alkaline contents of the duodenum to the gastric mucosa, so lowering or neutralizing gastric acidity, is shown by Olch and Elman. They say: "We next subjected normal animals to either gastroenterostomy, Polya-Balfour resection, or pyloroplasty or resection. The neutralization decreased emptying and quicker neutralization, and this is particularly the case following pyloroplasty or rsection. The neutralization in the gastroenterostomy was about the same as after vagotomy."

The influence of physiologic research on intestinal surgery has been notable. The studies of Cannon, Alvarez, Dragstedt and others on the movement of the intestines have been most helpful in surgical practice. Alvarez has shown that the usual intestinal peristalsis is largely myogenic and that the inherent wave of contraction in the musculature of the upper jejunum is about twenty per minute, whereas it is about eleven per minute in the lower ileum. The upper intestinal tract is not only more rapid and sensitive in contraction but is more easily affected by adverse influences.

According to Alvarez, stimulation may accelerate the rate of contraction of the lower ileum and so peristalsis can be reversed, as in the vomiting from acute appendicitis in which the irritation is confined to the region around the lower ileum; or, on the other hand, toxic influences that would overwhelm the upper small intestine may not so adversely affect the lower small intestine or the colon where the musculature seems to be more hardy. In this way, constitutional toxic causes may produce a marked impairment of motion in the upper small intestine, while not so profoundly affecting the lower small intestine, and so the same mechanical effect of reversed peristalsis will occur.

The great metabolic activity of the upper small intestine requires a large blood supply and much fluid. Obstruction in this region lessens absorption and causes pouring out through reversed peristalsis of the contents of the stomach and small intestines, and thus depletes not only the supply of water but of chlorides.

The surgical application of these physiologic facts is that in operations on the upper intestine an ample lumen must be provided because obstruction here is not only more keenly felt by the sensitive musculature, but because among other things rapid dehydration and loss of chlorides which follow it may be quickly fatal. It is also evident that with only a few bacteria in the intestinal contents of the upper small intestines, from the effect of the hydrochloric acid of the gastric juice, the lumen can be exposed more safely than in the lower small bowel and the colon where bacteria teem. The technical methods, then, must be altered to suit these conditions. The desideratum in the lower small intestine and the colon is to prevent contamination even if the lumen of the sutured bowel is not large. In the upper small intestine the indication is reversed.

The formation of calculi, particularly urinary calculi, has long excited interest. Osborne and Mendel about eleven years ago directed attention to the fact that often calculi appear in the urinary tract of rats used for nutrition studies, and that whenever such calculi were found it was where there had been an inadequate supply of vitamine A for some time. Fujimaki, of Tokyo, has more recently shown that rats fed with a diet deficient in vitamine A for a long time developed first bladder stones, then kidney stones, and finally stones in the bile ducts. The urinary stones are phosphatic, while the biliary stones are chiefly cholesterol. Deficiency in vitamine B apparently has nothing to do with the formation of stones, nor does the deficiency in protein in the diet seem to have this effect. After the stones have formed, as demonstrated by roentgenologic examination, they would in some instances disappear by altering the diet and including a large quantity of the fat soluble vitamines. Such treatment may in certains instances have a clinical bearing.

The study of the blood has been helpful in surgery, not only as regards diagnosis and prognosis, but in indicating the treatment. The aid of physiologic research in typing blood for transfusion and in indicating the desirability of using fresh whole blood is well known. The hemorrhagic diseases or anemias that seem to depend upon the excessive destruction of the red blood cells or of the platelets by the spleen are greatly benefited by splenectomy, whereas other anemias which are not dependent chiefly upon the spleen may be actually harmed by this operation.

While the physiologic function of the spleen is not fully known, the unique nature of its

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blood supply in which the arterial system is independent of the venous, its active phagocytic cells, and its function as a filter, command our attention. W. L. Robinson, of Toronto, has written interestingly upon the filtering capacity of the spleen, and concludes that electrical conditions have much to do with the filtering. He says that the pores of the Berkefeld and Chamberlain filters vary between 3.8 and 4.5 u., which are abundantly large for the passage of most bacteria, but that filtration occurs by the process of "adsorption of bacteria to the walls of the filter pore". When the electrical charge of the bacteria or the small particles is opposite that of the walls of the pore, filtration occurs. The Berkefeld and Chamberlain filters carry negative charges, and consequently filter out positively charged bacteria or particles. According to Robinson, colloidal platinum and silver particles are negatively charged, whereas colloidal copper is positively charged. The spleen filters out the platinum and silver, but the copper passes through and no trace of it can be found in the splenic cells. The filtration by the spleen, then, appears to be largely of an electro-physical nature, and is selective for this reason and not because of the vitality of the cells. The bearing of this may be important in the administration of intravenous remedies, and possibly in the interpretation of the destruction of blood cells by the spleen in certain anemias.

The physiology of the blood serum has shown that there is a rather constant constituent of 0.1 to 0.2 per cent dextrose in the blood. This dextrose provides energy for the body and is the chief caloric source. The splendid work in Professor McLeod's laboratory by Banting and his colleagues has resulted in the explanation of the action of the internal pancreatic secretion and in the isolation of insulin, which promotes the utilization of dextrose by the body. These discoveries have opened a wide field for helpful remedies in both medicine and surgery. When the vital tide of the body is at a low ebb, as in shock, dextrose and Ringer's solution administered intravenously give the normal constituents of the salts in the serum plus dextrose, and the addition of insulin supplies an element which in the depressed vital state of the body the pancreas may not be able to produce in sufficient quantity to utilize the dextrose.

Andrews and Reuterskiold sum up the actual physiologic effect of insulin to be three-fold: "(1) it promotes the storage of glycogen in the liver; (2) it converts glucose into some other hexose more readily oxidizable; (3) it brings about an increased affinity of tissue for water, thereby causing a concentration of the blood." After observing patients to whom insulin and dextrose were given after operation, they conclude that, for post-operative acidosis and dehydrated conditions, water and glucose alone are needed and insulin may be contra-indicated. When administering the dextrose intravenously and continuously, however, it would seem that a small amount of insulin, not enough for all the dextrose in the injected fluid, would be helpful in making the remedy more efficient. The urine should be examind frequently and, whenever sugar appears, the amount of insulin administered should be increased.

One of the greatest advances in recent years in the general treatment of toxic conditions is the continuous intravenous injection of dextrose solution, first advocated by Matas, who has made so many valuable original contributions to surgery. A 5 per cent dextrose solution in Ringer's solution may be given intravenously continuously for days. The dextrose solution must be pure, otherwise, reactions may occur, and the same precautions must be taken to use freshly distilled water and a prepared tube as in other intravenous injections. We have given it three days in succession, having a buret so arranged that the flow can be accurately controlled. Usually an intravenous cannula is employed, but for a period of a few hours the intravenous hypodermic needle is often satisfactory. In cases of shock this method is of great value. If used in the early stages of approaching shock it is preventive, and is often a reliable remedy even after shock has been established. At any rate, it will serve to maintain the blood pressure until a blood transfusion can be done.

It must be recalled that the conditions in shock and in sepsis are different. The chief phenomenon of shock is the lowered blood pressure due to lack of fluid in the vascular system; consequently, fluid must be supplied quickly. The heart is not over-strained, but there is an insufficient amount of fluid upon which it must contract. In such instances, 500 c.c. or more of dextrose solution can be given

intravenously within a few minutes. As soon as the pulse picks up, the rate of flow should be diminished and maintained only at such a level as is necessary to keep up a sufficient blood pressure. If this requires an undue amount of the solution after a few hours, blood transfusion should be done. About 1,000 or 1,500 c.c. can thus be administered intravenously in cases of shock within the course of two hours without any detrimental effect. If this rate of flow is continued longer, it is dangerous and there is, of course, the possibility of edema of the lungs and of other complications which must be watched.

In sepsis or in dehydration, however, the intravenous administration of dextrose solution should be much slower. Usually an initial flow of 200 or 250 c.c. an hour is sufficient, and this should be gradually cut down to 100 or 150 c.c. an hour. We have found that a flow of less than 100 c.c. an hour, even with an intravenous cannula, and especially with a hypodermic needle, permits the cannula or needle to clog. After every 500 c.c. of 5 per cent intravenous solution, 10 units of insulin are injected into the rubber tube. The administration of insulin with dextrose solution in shock was described by Fisher and Snell, who, with Thalhimer, Ort, Irwin and others, advocated the use of dextrose with insulin in post-operative acidosis and toxemia.

Not only in toxic conditions and in shock, but in operations upon the stomach or intestinal tract where physiologic rest of these viscera for repair is indicated, nutrition can be maintained for many days by this method, and more effectively and with much less discomfort than by either hypodermoclysis or rectal administrations. In many affections of the liver the administration of intravenous glucose with insulin is excellent therapy, for the burden of storing the carbohydrates and giving them off is one of the chief hepatic functions. By this method some physiologic rest for the liver is secured. In operations upon patients with hepatitis, which Evarts Graham has shown practically always accompanies inflammation of the gall-bladder, the function of the liver may be greatly aided by the intravenous introduction of dextrose.

In intestinal obstruction of the upper intestinal tract there is, according to Haden and Orr, a marked decrease in blood chlorides and an increase in the blood urea, and the intravenous administration of sodium chloride is helpful. They recommend that sodium chloride be given, one gram per kilogram of body weight as the initial dose; then the chlorides in the blood should be watched to estimate subsequent doses. They first conceived that the beneficial action was due to the fact that the toxic material elaborated by the obstruction was neutralized by the sodium chloride. They have, however, abandoned this theory and the more recent explanation is that low blood chlorides in obstruction are at least partly due to the loss of chlorides from vomiting or from pouring out into the stomach or intestine large quantities of fluid containing chlorides which, on account of the pathologic condition, are not readily absorbed. Practically the same blood changes are found after a duodenal fistula in which there is loss of gastric juice and of pancreatic juice, and the intravenous injection of saline solution is helpful in such cases.

The physiology of the sympathetic system is not yet definitely ascertained. Doubtless many operations on the sympathetics have been based upon an illogical interpretation of unproved theories, but there is a field for the surgical treatment of certain diseases that seem dependent upon abnormalities of the function of the sympathetic system. The removal of the lower sympathetic lumbar ganglion in cases of megalocolon has proved in some instances beneficial. The extirpation of the colon in Hirschsprung's disease is not usually a satisfactory procedure. Operations on the cervical sympathetics in certain cases of angina have been satisfactory. The removal of the adventitia of large arteries for pain due to ischemia in the extremities is more uncertain, but in some cases seems to bring relief.

These few examples may give some conception of the debt that modern surgery owes to physiology. Physiology has also benefited by the careful study of clinical cases which always offers a fruitful field for research.

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TULAREMIA.*

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Dr. Edward Francis defines tularemia as an infectious disease caused by bacterium tularense. Primarily it occurs in nature as a fatal bacteremia of wild rodents, especially rabbits and hares. Secondarily, it is a disease of man transmitted from rodents to man by the bite of an infected blood-sucking tick or fly, or by contamination of his hands or his conjunctival sac with portions of the internal organs, or with the body fluids of infected rodents, flies or ticks.

Tularemia has been reported from all states in the union, except the New England States, Delaware, Wisconsin and Washington. Outside of the United States cases have been reported from Japan and three laboratory infections in England. This case is reported because of its incidence in this locality and because the hunting season, in which cases are more likely to be prevalent, is approaching.

Prior to 1924, but fourteen cases had been reported. Up to May 1, 1928, 613 cases had been tabulated by Dr. Francis.

The disease is found amongst ground squirrels, wild rabbits and hares, and wild rats. High susceptibility has been found in man, monkey, ground squirrels, rabbits, guinea pigs, mice, woodchucks, opossums, and young coyotes. Slight susceptibility in rats, cats, sheep and goats. Horses, cattle, hogs, dogs, pigeons and chickens have been found non-susceptible. Domestic rabbits have never been found naturally infected.

Tularemia is transmitted to man by the bite of the horse fly, by the bite of the wood-tick, and by contamination of hands or conjunctival sacs with the infectious material from rabbits, flies or ticks. It has been found that wood-ticks transmit the infection through their eggs to the next generation of ticks, thus perpetuating the source of infection.

Contamination, or self-inoculation, has caused most of the human cases, principally from handling and preparing infected rabbits for cooking. The handling of infected animals in laboratories has been a fertile source of infections among laboratory workers, practically none escaping.

Bacterium tularense is destroyed by heating ten minutes to 58° C. However, a piece of infected rabbit cooked ten minutes, and nicely browned, but showing red muscle tissue near the bone was found to be infectious. The infection gains admission through breaks in the skin, through the conjunctivae, and it has been demonstrated that infection through the unbroken skin is possible.

In this section of the country the disease is most prevalent in the seasons when rabbits are hunted, for here rabbits are practically the only source of infection.

Pathologically, the infected lymph nodes in microscopic section are very like tuberculosis, and diagnosis is made by failure to demonstrate tubercle bacilli and positive serum findings of tularemia.

The incubation period of this disease varies from one day to nine days, average about three days. The onset is sudden with chills or chilliness, fever, sweating, headache, vomiting, aching, bodily pains and prostration.

There are four types of the disease:

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The ulcero-glandular, which is most common, is characterized by a definite break in skin as portal of entry, and enlargement and tenderness of regional lymph glands. The patient complains more of the soreness in the glands than of the sore, but the ulcer will be found to be not greatly inflamed, full of thick pus, and leaving a well defined hole when evacuated.

There may be subcutaneous nodules along the vessels between the ulcer and the adjacent glands. There is redness of the skin overlying the enlarged and tender glands, and this redness may extend to the original lesion. In about half the cases the glands suppurate and rupture. Whether they suppurate or not the glands remain enlarged for a long time—two or three months. The acute symptoms last for two or three weeks or more, with fever, sweats, recurring chills and prostration.

The oculo-glandular type is due to infection through the conjunctivae, and is characterized by early local irritation and edema and usually a papule on the conjunctiva of the lower lid. There is secondary swelling and pain in the neighboring lymph glands, about half of which go on to suppuration. The constitutional symptoms are the same as in the ulcero-glandular type.

The glandular type is the same as the ulcero-glandular, with no open lesion.

The typhoid type is characterized by fever as the only outstanding symptom.

In all cases the fever shows an initial rise of one to three days, a remission of one to three days, followed by a secondary rise, and then gradual decline to normal. Some cases show a maculo-papular or pustular eruption.

The white cell count is moderately increased. Convalescence is slow. After the acute symptoms have subsided there remains a general weakness, which may last for months. Recovery is the rule, but twenty-three deaths have been reported in six hundred and thirteen cases.

One attack confers immunity, which seems to be permanent.

The diagnosis depends principally on having the disease in mind. Cases have been orginally diagnosed "flu", typhoid fever and septic infection, but history of possible source of infection with examination of blood for agglutination will clear any doubt as to diagnosis. The agglutinins do not appear in the blood until the second week, with an abrupt rise in the titre in the third week, reaching its maximum in the fourth to seventh week, and falling in the eighth week, with a gradual decline thereafter for a year. The agglutinins persist in the blood in recovered cases, having been found after nineteen years.

Since there is cross agglutination of serum of tularemia with abortus and melitensis, a suspected tularemia serum should also be checked for these diseases unless they can be ruled out clinically.

The treatment is symptomatic. The enlarged glands should be left alone unless they suppurate. Early incision into the glands has been followed by exacerbation of acute symptoms. When suppuration occurs, drainage is indicated.

Case Report

No. 18224. A deck-hand on a small boat, admitted to the U. S. Marine Hospital, Norfolk, Virginia, on July 13, 1928, gave the following history:

Family history negative.

Previous personal history: Measles and whooping cough in early childhood. Influenza in 1918. Tonsillectomy three years ago. No history of venereal infection.

Present illness: Patient states that he felt all right until July 1, 1928, when he contracted a rather severe "cold" and felt bad all over. On July 2nd, he hurt his left hand by striking a dried claw of a bear in palmar surface at base of ring finger. The wound was slight and gave him no trouble. On July 3rd, he killed, skinned and prepared for cooking a half-grown rabbit. Previous to this he had not touched a rabbit for three weeks. He dressed the rabbit on July 3rd, immediately after killing it, and noted nothing unusual about it. Others ate part of the rabbit, but no one else got sick. He still felt ill from his cold, but on July 6th he felt much worse, with headache, fever and chilly sensations in the evening. On July 7th, he had a doctor who told him his temperature was 103. On July 8th, he noticed that he had a swelling above and inside of the left elbow and left axilla. These swellings were not very painful. Wound in left palm had scabbed over and gave no trouble. Patient continued to have high fever with headache and general weakness, and on July 13th was admitted to hospital.

On admission, examination showed white

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male, age 17, build slight, weight about 110 pounds. Patient apparently ill, having general appearance of early typhoid patient. Physical examination was negative with the following exceptions:

Blood pressure 140/80.

Spleen enlarged, easily palpable, and of firm consistency.

Small sore on palmar surface left hand at base of ring finger. Not much inflamed or very tender, but, on removal of crust, discharged a moderate amount of thick pus and left a punched-out ulcer. Left epitrochlear gland was large as a bantam's egg, moderately tender and not sharply defined in outline. Axillary glands in left axilla were as large as a lemon, slightly reddened, tender and not sharply defined. There was some limitation of motion at elbow, but practically none at shoulder on account of soreness. No other glands were enlarged.

Patient's urine was negative.

Wassermann negative.

Widal negative.

White blood count 14 300.

Blood culture negative.

Malaria smear negative.

On admission his fever was 102 at noon. His temperature was lowest at 8 A. M., and highest at 8 P. M. On July 20th his morning temperature was 101, his evening temperature 104. From that time it declined very slowly until August 9th, when he ceased to have any fever.

His pulse ranged from 80 to 120 at the height of his fever, but he had a tachycardia of 90 to 120 as late at August 31st. His spleen was palpable until about August 26th.

The wound on the hand healed rather promptly. The epitrochlear gland did not break down, but subsided practically completely by September 1st. The axillary gland showed softening and was not opened until August 18th, when it was incised and packed. It drained freely and healed, but the gland was still palpable on September 4th.

On July 18th, the blood, tested by Dr. Edward Francis, of Hygienic Laboratory, was found to agglutinate bacterium tularense, 1 to 80; on July 27th, 1 to 1,280; and on September 4th, 1 to 640, confirming diagnosis of tularemia.

The rabbit blamed for this infection was killed eight miles south of the Virginia-Carolina line on the Dismal Swamp Canal.

THE INFLUENCE OF FORCED FLUID ADMINISTRATION ON THE COURSE OF MERCURY POISONING.

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Most patients suffering from poisoning following the oral administration of mercuric chloride are subjected to treatment only after the lapse of some little time. Burmeister and McNally[1] have shown how rapidly mercuric chloride is absorbed from the alimentary canal; consequently, in these clinical cases, account must be taken of the poison which has passed into the circulation, as well as of that which still remains unabsorbed when the patient comes under observation. A recognition of this fact, as well as the occasional occurrence of poisoning from the parenteral administration of some mercury preparation, has led to various suggestions, in the hope of rendering the absorbed mercury innocuous.

In reporting the recovery of a large proportion of the cases of mercury poisoning observed by them, Lambert and Patterson[4] stressed the importance of forced fluid administration, the object being to dilute the poison and hasten its elimination. Subsequently, however, Sansum[5] found that, after the intravenous injection of barely the fatal dose of mercuric chloride, it was impossible to save dogs by the administration of enormous amounts of fluid, amounts which must have effected great dilution of the blood and produced copious diuresis.

In the vast majority of instances of clinical poisoning by mercuric chloride, the salt has been taken orally; Sansum's results did not prove that fluid administration was valueless here. To obtain information regarding the influence of fluid administration after oral ingestion of mercuric chloride, experiments were carried out on dogs in this laboratory during 1922. The method of procedure was as follows: The animals were fasted twenty-four hours and were then given 20 mgm. of morphine sulphate per kilogram subcutaneously. In about thirty minutes, the mercuric chloride was administered, through a stomach tube, in the form of a 5 per cent solution in distilled water. From a considerable number of experiments, it was concluded[2] that a dose of 20 mgm. of mercuric chloride per kilogram.

administered to dogs in the manner described was "fatal in the great majority of cases unless some form of treatment is employed." With this assumption, the efficacy of fluid administration was tested by first giving the dogs 20 mgm. of mercuric chloride orally and then injecting large amounts of isotonic salt solution intravenously and intraperitoneally. Of twenty-five animals poisoned by the stated dose of mercuric chloride and treated by forced fluid administration, twenty (80 per cent) survived for at least one month. It was concluded, therefore, that the intravenous and intraperitoneal injection of large amounts of isotonic salt solution was of definite benefit in dogs poisoned by the oral administration of mercuric chloride.

Not infrequently, physiological salt solution is looked upon as an inert fluid; such an attitude was adopted in reporting our earlier results. Obviously, such a course is scarcely justified; the supposed favorable results obtained by administration of salt solution might be the result either of the fluid or of the contained sodium chloride. In the hope of shedding light on this aspect of the question, additional experiments were carried out, the results of which have shown that our earlier conclusion as to the favorable influence of forced fluid administration in dogs poisoned by mercuric chloride was erroneous. Isotonic and hypertonic solutions of sodium chloride, dextrose, and sodium sulphate alike proved of no apparent value in dogs that had received sufficiently large doses of mercuric chloride by mouth.

Since the completion of these later experiments by us, a paper by Hesse[3] has appeared. In this paper, Hesse states that he has found forced fluid administration of no value in animals poisoned by orally administered mercuric chloride, and explains our earlier mistake[2] by the statement that the dose of mercuric chloride which we assumed to be fatal in the great majority of the control animals was too small,—recovery frequently taking place after the oral administration of 20 mgm. of mercuric chloride per kilogram orally to dogs. Hesse employed a slightly different technic from that utilized by us. Disregarding our earlier experiments, we now have the records of thirty control dogs that received the dose of 20 mgm. of mercuric chloride per kilogram in the manner described in our earlier paper.[2] Of these thirty untreated animals, four survived as long as one month, and the remaining twenty-six succumbed, usually within a week following the mercury administration. Of eighty-eight control dogs given 25 mgm. of mercuric chloride per kilogram, eighty-five succumbed and three survived. With a reduction of the dose of mercuric chloride to 15 mgm. per kilogram, fourteen out of eighteen dogs succumbed within a period of one month. We cannot agree with Hesse, therefore, that the dose of 20 mgm. of mercuric chloride per kilogram is not sufficiently large to cause death in the great majority of dogs when the poison is given according to the method which we employed. The fact remains, however, that he is correct in saying that forced fluid administration is incapable of saving dogs poisoned by fatal doses of mercuric chloride. In our recent experiments, part of the dogs were fed an exclusive meat diet for some days prior to the mercury administration; others were fed exclusively on bread and milk, but the results were fully as poor in the treated dogs as in the untreated one, regardless of previous diet or of the solution employed in treatment. In the first experiments, where it appeared that saline injection was of benefit in dogs poisoned by mercuric chloride, the serious mistake was made of first determining the supposed fatal dose of poison and then testing the influence of treatment on animals that had been given this dose of mercuric chloride, without the precaution of simultaneously running controls. It is possible that an error was made in preparing the solution of mercuric chloride; the chance of seasonal variation in the resistance of the dogs to mercury poisoning must also be taken into account. Whatever the explanation may be, our later observations have convinced us that forced fluid administration, in the form of isotonic or hypertonic sodium chloride, dextrose, or sodium sulphate solutions injected intravenously and intraperitoneally, has not the least beneficial action in dogs poisoned by mercuric chloride. Contrary to what is true of certain other measures that have been proposed for the treatment of mercury poisoning, the use of isotonic saline solution appears to be a safe procedure, in so far as any intravenous injection may be considered safe. However, forcing fluid in the manner advocated by Lambert and Patterson[4] causes the patient some little discomfort, a factor that

may deserve consideration in view of the apparent valuelessness of the procedure.

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MENTAL PROPHYLAXIS.

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The study of disease processes in general, with advancing knowledge in the difficulties in instituting remedial measures for end results, has more and more focussed attention upon prevention. Every acute infectious disease holds possibilities of sequelae whose end results are irremediable. Many of the more chronic disorders, once they have become full blown, are practically beyond the possibility of complete return to normality. Thus the realization has been thrust upon us that some means must be sought to reduce the incidence of organic disease processes and hence relieve the tremendous economic loss entailed therefrom. From a purely practical standpoint we are confronted with a large array of economic liabilities in such diseases as tuberculosis, carcinoma, syphilis, etc., not only in the impaired usefulness of the individual, often in the most productive period of his life, but also in the burden upon the treasury of the state in caring for those affected.

This trend towards prophylaxis is becoming more and more apparent in the field of nervous and mental disorders. There is no more disheartening outlook than attempt at rehabilitation of those so affected. So, here too we turn to preventive measures as holding the greatest possibilities for coping with the situation. The sum total of liabilities incurred by all types of mental diseases is staggering in its proportions, and there is a woeful lack of knowledge on the subject by the average individual not coming in direct contact with these problems. It is with the idea of attempting to impress the magnitude of the problem upon the average practitioner of medicine that this article has been undertaken.

The problem of the mentally incapacitated has a twofold economic aspect: criminology and the care of the otherwise maladjusted. We shall consider only the latter group and see what an array of facts may be elicited from this alone. There is probably not a man practicing medicine today who does not realize the importance of preventive measures aimed at tuberculosis and venereal diseases. But there are few who know that the total number of beds devoted to the care of the mentally sick exceeds the number devoted to all other types of disorders combined. In other words, even with the facilities which we have and which at present are inadequate to care for all who need attention, we are handling more individuals suffering from mental diseases than those needing attention for all other types of disorders. In 1925 there were 322,342 patients in hospitals for mental diseases in this country. Seventy-five thousand new patients are admitted annually. We spend approximately three hundred million dollars ($300 000,000) each year in caring for the mentally sick in our hospitals. In some states one-eighth of the total revenue is required for the upkeep of such hospitals. In other states the expenditures would be greater if the facilities for handling such patients were more nearly adequate. These figures do not take into consideration the economic loss through the incapacitating of the individual for productivity. Nor do they include the tremendous liabilities incurred by the state in the handling of those criminals whose maladjustment is the result of psychopathology.

Every citizen of this country is justly proud of our economic progress and stability. The growth of each of our cities is a matter of intimate interest. We may stand on "Main Street" and feel a thrill of enthusiasm as we watch the crowds pass by. But how different a picture to the mental eye it is when we consider that one in every twenty-five who goes by thus in the passing throng has been or will be mentally sick and a liability. We are justly proud of the public schools which are daily increasing in numbers, physical qualities, and efficiency and which are caring for greater and greater numbers, bringing education to all. It would be a stirring sight to have the 24,000,000 school children pass in parade before us.

But consider that in this crowd one million will be mentally sick at some time under our present system.

Of the 322,342 cases cared for in our hospitals, at least one-half could have been saved from this necessity through preventive measures. It would be difficult to exactly visualize the economic saving thus brought about. It does not require a very vivid imagination, however, to realize that preventive measures instituted in the early formative era of life over a comparatively brief period of time would cost the state considerably less than the total care of the individual later over a period of from twenty to thirty years. Add to this the saving of the individual productiveness and the balance in favor of prevention is still greater.

It is this problem which mental hygiene is attempting to cope with. Of course, the problem is humanitarian as well as economic. It is twofold in its scope: to deal with organic diseases as well as with environmental influences. Individual behaviour is the resultant of organic constitution reacting to external environment. Hence, all organic disease processes are factors in the equation. This necessitates a liaison with all other agencies devoted to preventive measures. As noted above, the normal approach and the most telling to any problem in prevention is early in life. Therefore, some form of child guidance is the most effective mode of attack in the prevention of mental disease.

The term "child guidance" covers a tremendous field. It means the co-ordination of a great many agencies. In fact, it covers every branch of medical and sociological activity. There is no specialization in medical practice which is not involved. We have to deal with an attempt to prevent or eradicate physical abnormalities which may disturb nervous equilibrium, and an attempt to inculcate principles of right habit formation or correct early in life beginnings of faulty adaptations.

The attack on the problem of physical abnormalities should go back to parenthood. Many cases of congenital defectiveness, of nervous instability, may be traced to disease conditions in the mother—infectious, physiological and nutritional disorders. Hence, the obstetrician should be the first to start the solution of the mental hygiene of the individual. After birth the prevention and eradication of the physical defects which would contribute to nervous imbalance come within the scope at sometime of every medical practitioner.

This is only half the solution of the problem. Even with a reasonably sound organic make-up, the individual is still a liability unless he is properly reared and moulded. This means the inculcating of proper habit formation and the avoidance of abnormal defense reactions. This problem is both sociological and psychological. We train men and women in various vocations whereby they may earn a livelihood, but we do next to nothing to teach them to be parents. We breed our livestock and control their environment on a much higher plain of scientific endeavor than we do our off-spring. The majority of children are accidents, born into a haphazard, hit-or-miss environment. The question of survival of emotional balance is largely a matter of chance. Parents should be taught in methods of inculcating emotional control, the avoidance of emotional habituation by avoidance of emotional atmospheres chronically in adolescence, sex education, and general sanity in child rearing. Life should be neither too hard nor too easy in its beginnings, and the striking of a happy medium is a delicate matter which must be fitted more or less to each individual case in a common sense manner, and not left to chance.

We do not propose by these methods to displace the home. The home is fundamental in our present system and the best results proceed from the proper kind of home. What is proposed, however, is to attempt to make the home more effective when possible. The problem of rearing children cannot be left to instinct. It should be guided, as should all other acts, by experience. Growth and betterment of methods can be attained only by a multiplication of individual experience for the benefit of everyone concerned. That is the only way to make progress in any endeavor. Individual experience alone is inadequate. By co-ordinating and recording individual experience and passing these on to others progress may be obtained.

On the other hand, there are instances when a substitute for the home must be found. This occurs more particularly with orphaned children and where the so-called home is of such a character as to make proper reformation into an adequate environment impossible. This latter condition unfortunately is all too prevalent and constitutes a larger problem. It is from

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this source that the state draws the heaviest economic burden of misfits—criminals and otherwise maladjusted.

So the whole problem hinges around the control of environmental factors in the beginnings. This means environment in the broad sense, both exogenous and endogenous. This begins prenatally and is most potent throughout the formative period; up to the age of fourteen to sixteen. Dorsey has said that, "Mohammed, born on Beacon Hill, would probably have gone to Harvard and been a Unitarian." John B. Watson, in his well controlled experiments on growing children, has pretty well shown that the inheritance factor in personality make-up is minor. He has brought out most forcibly the tremendous influence of environment in its broadest sense upon future behaviour. The number of combinations inherent in personality make-up makes it impossible to predict beyond peradventure, but it is self-evident that environment, properly controlled, will give rise to the best possible results.

This tremendous problem of child guidance by a proper liaison between the agencies of education and medical control—social agencies, scholastic agencies, psychological guidance and strict preventive and corrective medicine, in its solution, is the only rational cure for our mental ills. The economic problem involved is not nearly so monumental as that involved in the constantly increasing demand for the care of end results. It is a surprising fact that a comparison between the birth rate and the rate of increase in mental diseases would lead to the logical conclusion that there will ultimately be more insane than sane individuals. We hope this is a *reductio ad absurdum*. The eradication of the substratum of misfits can be attained only by the slow process in child guidance, so that mental sanity may "move forward on the feet of little children."

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THE FIVE POINT CHILD AND SCHOLASTIC CREDITS.*

By LAWRENCE T. ROYSTER, M. D., University, Va.

The attitude of society toward the child in various periods of history furnishes an interesting theme for study; in fact the advance of civilization is best appraised by the regard in which the child is held and the care given it. A relatively short time ago the child was looked upon as a burden to the family and a liability to the state, nor did this attitude change until man power for armies and leadership in the economical and political world were threatened by a low birth rate and a high infant mortality. The world then awoke to the realization that men and women could not be had to carry on its work without an adequate number of healthy children, and the child was recognized as an asset.

The first step taken when these facts were recognized was the establishment of hospitals for the special care of children. These hospitals were far from suited to the needs of the patients, the number of attendants totally insufficient to properly care for them, and the result was inevitable, a death rate scarcely less than before their founding. But the beginning had been made, and the effort to ameliorate the situation was honest.

For a long time education was a possession possible only to the classes, but when it was recognized that the only safe citizenry was an educated one, there was created a demand for universal enlightenment. This awakened interest was largely due to the prophetic vision of that greatest of all democrates—Thomas Jefferson—and his dogmatic assertion that a people was capable of self-government only if educated. Slowly at first, but soon by leaps and bounds, state supported schools grew in size and number until the great American public school system was developed, another criterion of the advance of civilization.

The popularity of the public school increased with such rapidity that numbers of pupils far in excess of the capacity of the limited number of available teachers, were enrolled, carried through the mill, and turned out as "finished products", apparently in the same spirit that manufactured goods were produced in commercial factories, in mass production, often at the expense of quality. The greatest fault of the public school system of today is that it is a "system". It is suited necessarily to the needs of the vast number of average children, the exceptional child, either above or below the average, being lost sight of and inevitably neglected. Many of the faults of the educational system are, however, being overcome year by year and many improvements are manifest.

For many years the scholastic education of

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the child alone was considered. School sanitation was slow in being recognized and the health of the pupils totally disregarded. When, however, it was recognized that the mental advance of children might be, and often was, dependent on the state of health, or physical well being, a new factor entered into the educational problem. Attention to the health of the child was furthered by the rapid popularization of the Child Welfare Movement. The first "Medical Inspection" of school children was in the interest of the detection of infectious disease and the prevention of its spread. Subsequently, an effort was made to discover to what extent childen fail to learn and progress because of physical and mental defects, malnutrition and fatigue.

Few of the younger generation of physicians and educators can appreciate the struggle of a few far-seeing pioneers to have the importance of general examinations of all school children recognized. Opposition came from the medical profession, school authorities and parents, and those who advocated such examinations were looked upon as visionaries and fanatics. Truth prevailed at last, however, medical examinations became a routine part of the school program, and the incidence of sickness was reduced and attendance on school definitely increased.

Today we are in position to study large groups of children in the public schools, to determine what the normal child is, and to do more constructive work for the health of children and the adults of the next generation, than at any previous time. Virginia, among other states, is doing her part, and as a step in this direction has adopted a *minimum* standard known as the "Five Point Child". As stated, this is a *minimum* with the following points:—Hearing must be good, tonsils must be free from evidence of disease or have been removed. There must be no decayed teeth or cavities must be filled. Vision must be good or defects corrected by glasses; and the weight must be up to the average for a given height as a guide to the state of nutrition.

Periodic examinations of the children are made to determine these facts and they are graded *physically* in accordance with the findings. Recognition is given those measuring up to the standard by means of stars placed on cards hung in the schoolroom, and at the end of the session certificates are given the "Five Pointers", signed by the State Health Commissioner and the State Superintendent of Education. A further effort is made to have the child maintain this standard, for it must be remembered that a child may be a five point child this session and only a four point or a three point child the next session; in fact conditions may change from month to month. Results are obtained through securing the co-operation of parents, and what is more important,—the co-operation of the children themselves. Very often parents are indifferent, and results must be secured through the co-operation of the child alone, who develops a pride in gaining the five point standard. Children not only often insist that their eyes be examined, their teeth filled, and their tonsils removed, but demand the right quantity and quality of food, and in many instances secure the benefits of all through their own efforts.

Regular attendance at school (fewer absences per child) is noticeably more consistent among the five point children than among those possessing uncorrected defects. It is astonishing to find how many schools have anywhere from 100 to 50 per cent five pointers in the short time this plan has been in operation. So far an effort has been made only to make those already in school to measure up to this minimum standard; and this must be extended so that examinations will include pre-school children in order that they may enter school "five pointers". It is well recognized that the period of the greatest neglect of children is between the end of the second year and the time of entering school—the period known as the run-about or pre-school age.

The *minimum* must be raised, however, for a star is brilliant in proportion to the number of its points. Thus there must be added to the existing *minimum* an assurance of freedom from tuberculosis. The posture—often a guide to the state of nutrition and fatigue—must be correct. Teeth must not only be clean and cavities filled, but the occlusion must be good. And finally, each child on entering school must have been inoculated against those diseases, whose prevention through inoculation has been proven. On the health of the child from birth to adolescence depends not only in large measure the scholastic progress, but also the future carrying on power of the individual—be he laborer, business man, profesional man, or most important of all, parent

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—in fact the stability of the citizenry of the next generation.

Thus we see that an important branch of education has been introduced into the curriculum of the public school system, for what could be more important than the knowledge of how to take care of one's health, and this the child is learning. If, therefore, we admit the truth of this, why should not children be given "credits" on their scholastic standing for physical well-being?

I therefore make this plea: That as soon as practicable the school authorities of Virgina allow "credits" on class standing for physical fitness as determined by our minimum standard—the five points—in proportionate ratio to their other studies; and that a child entering school as a five point child, be given these credits in advance. Of course a child who loses one or more points of the star will be deprived of a proportionate number of credits.

(EDITOR'S NOTE: Following the reading of this paper, the Virginia Pediatric Society adopted a resolution that this paper be published in the MONTHLY and in the VIRGINIA JOURNAL OF EDUCATION, that it might reach the physicians of the State as well as the teachers and State educational authorities.)

SENILE EPILEPSY (EPILEPSIA TARDA).

By FRANK H. REDWOOD, M. D., Norfolk Va.

Convulsions occurring in an individual who has passed the age of forty years give the physician much concern as to the causation of the attack. Why anyone should have periodic fits is a question that cannot be answered. All that one can say is that there must be a factor, as yet unknown, that precipitates the attack and this factor must be variable in its effect upon each human organism. A sudden disturbance of the cerebral circulation has been known to produce convulsions and I have seen a bitemporal hemianopsia lasting half an hour in a healthy patient, after surf bathing, showing that deranged cerebral circulation may interfere with the normal cerebral mechanism.

In the past eight years I have seen seven cases in my own practice and in consultation which can be classified as Senile Epilepsy or Epilepsia Tarda. Reisman,[1] in a recent publication, reports twelve cases and suggest the following classification:

1. The arteriosclerotic group.
2. The hypertensive group.
3. The mixed hypertensive-arteriosclerotic group.
4. The endocrine dysfunction group including diabetes mellitus, dyspituitary and hypothyroid disorders.
5. The cardiac group including Stokes-Adams disease and aortic stenosis.

Reisman says that the groups are by no means sharply defined but merge one into another. This was true in my cases.

CASE NO. 1.—Mr. T. L. Age 49. For the past year has had attacks of vertigo lasting a few minutes and of frequent occurrence. November 26, 1927, the day before coming under observation he suddenly felt dizzy and peculiar and in a few minutes he had a generalized convulsion. After he regained consciousness he was clouded mentally for half hour and then felt as good as before. Never had convulsions in childhood.

EXAMINATION: Blood pressure 180/95. Weight 192. Heart sounds indistinct but no murmurs heard. The arteries were moderately thickened. Chest and abdomen negative. Reflexes normal. Fundi normal. There were a few pus cells in urine, otherwise negative. Wassermann negative. Blood count, blood sugar and calcium within normal limits. Urea nitrogen 14 and urea 31.5. Electrocardiogram showed distinct evidences of myocarditis. November 30, 1927. Patient was referred back to family physician and advised digitalis with some sedative. February 2, 1928. Has attended to his duties and has had no further convulsions.

DIAGNOSIS: Senile epilepsy and myocarditis.

CASE NO. 2.—Mr. G. T. Age, 50. June 19, 1923. One month ago he suddenly became unconscious and had a convulsion that lasted ten minutes. When he re-acted he felt weak and heart was fast. For one month he has averaged from two to three attacks weekly. Was forced to give up his work on account of convulsions. No childhood convulsions.

EXAMINATION: Blood pressure 110/80. Weight 150. Arteries slightly sclerotic. Heart shows no murmurs but the sounds are indistinct and distant. Heart is enlarged. Pulse is slow at times. No irregularity. Electrocardiogram shows definite myocardial weakness. Urea nitrogen 26. Urine, blood count and Wassermann negative. He was treated with digitalis and bromides. February 18, 1928. Is working every day and has had no convul-

*Read before the Norfolk County Medical Society, May, 1928.

sions in four years although he says at times he feels weak.

DIAGNOSIS: Senile epilepsy and myocarditis.

CASE No. 3.—Mr. W. B. Age 55. October 24, 1927. Ten months ago the patient had an unconscious attack lasting several days, during which he had a number of general convulsions with tongue biting and foaming at the mouth. In two weeks he was feeling well and went back to work. Six months later had another convulsion lasting thirty minutes. Three months later had another lasting fifteen minutes. The convulsions are ushered in by a pressure in the head and flushing of the face. Past history is negative.

EXAMINATION: Blood pressure 140/100. Weight 125. The heart shows an occasional extra-systole but the sounds are clear and distinct. Pulse 99. The abdomen is pendulous and there is some oedema of the legs. Reflexes normal. Fundi are distinctly outlined, no hemorrhages seen and the vessels appear normal. Electrocardiogram showed distinct myocardial changes. The urine showed a medium ring of albumen with occasional hyaline casts. Blood count, Wassermann, gastric analysis, calcium and blood sugar normal. Urea nitrogen 18 and urea 39. He was given digitalis and luminal and has had no further trouble.

DIAGNOSIS: Senile epilepsy, myocarditis and chronic nephritis.

CASE No. 4.—M. J. Colored. Age 45. October 8, 1927. Has had fits for two years usually occurring around menses. Recently has had two or three convulsions a month—last ten to fifteen minutes—falls, bites tongue.

EXAMINATION: Blood pressure 190/100. Weight 210. Heart is enlarged to the right, regular, no murmurs. Peripheral vessels moderately thickened. Wassermann and urine negative. February 20, 1928. As long as she takes luminal she does well but if it is discontinued for a week she has a convulsion.

DIAGNOSIS: Senile epilepsy.

CASE No. 5.—Mr. L. W. Age 58. February 12, 1926. Patient always healthy until December, 1925, when he had a convulsion while asleep that lasted one hour. Five weeks later had another convulsion while asleep. Between these two attacks he felt well except for slight dizziness.

EXAMINATION: Blood pressure 205/130. Weight 200. Heart was regular, no murmurs. Pulse 74. Peripheral arteries much thickened. Nervous system normal. Severe pyorrhoea. Urine, Wassermann and blood count normal. Blood sugar 80, blood urea 26, non-protein nitrogen 49. March 23, 1926. No convulsions. Had all teeth removed. Blood pressure 210/120. February 23, 1928. Doing well. Urine shows an occasional hyaline and granular cast. Urea nitrogen 16.3. Urea 34.8. Blood pressure 165/120. Has been on luminal for two years.

DIAGNOSIS: Senile epilepsy and chronic nephritis.

CASE No. 6.—Mrs. V. G. Age 55. December 11, 1919. Four years ago had a convulsion. One year later had another followed by another in eighteen months. Four weeks ago had another convulsion. The fits lasted one and one-half hours, foaming at the mouth and biting tongue.

EXAMINATION: Weight 150. Heart enlarged. No murmurs. Blood pressure 180/100. Arteries much thickened. Neurological survey normal. The fundi showed the vessels to be tortuous. Slight oedema of the ankles. Two abscessed teeth. Urine and Wassermann test negative. X-ray showed Paget's disease of the skull. December 22, 1919. Had an attack today lasting eight minutes—bit her lips—no aura.

This patient was not greatly benefited by any treatment and died two years later with a cerebral hemorrhage.

DIAGNOSIS: Senile epilepsy, Paget's disease of skull, hypertension and arteriosclerosis.

CASE No. 7.—Mrs. T. S. L. Age 58. March 11, 1926. Patient had been troubled with severe occipital and frontal headache for several weeks. Five days before this examination suddenly had a convulsion during the night, bit her tongue—lasted twenty minutes.

EXAMINATION: Weight 163. Blood pressure. 195/100. Heart regular and there was a systolic murmur at the apex. Peripheral arteries sclerotic. One abscessed molar tooth. The vessels of the eyegrounds were tortuous. No neurological signs. Wassermann and urine negative. Blood count showed a slight secondary anemia. Urea nitrogen 18; urea 40; uric acid 3.8 mg.

This patient has been on luminal, her bowels have been kept regular and she has had no further trouble.

DIAGNOSIS: Senile epilepsy.

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One other case might have been included in this series but it was thought that the evidence pointed more to Adams-Stokes' syndrome than to a cerebral cause for the convulsion and therefore was not included.

Studying these case histories, there are several points of interest brought out. All had recurrent grand mal attacks, five of which occurred in the day only and two were nocturnal only. There were three women and four men with an average age of fifty-two years plus, the oldest fifty-eight and the youngest forty-five.

Five of the cases may be grouped as hypertensive and two as arteriosclerotic. Only two cases showed ophthalmoscopic pictures of arteriosclerosis but all of the cases had clinical or electrocardiographic evidences of heart disease and all but one showed palpable evidence of general arteriosclerosis. So that in all the cases the backgroud is judged to be some disturbance of the circulation.

The results of treatment of these seven cases show that one patient has died, three have had other convulsions since the diagnosis was made and treatment instituted, and three have had no further convulsions.

In discussing the mechanism concerned in the production of senile convulsions, the recent work of Bordly and Baker[2] deserves serious attention. They have shown that it is possible to have cerebral arteriosclerosis without clinical evidence and that such findings were demonstrated in all of their cases of so-called "essential hypertension". Further, they say, the blood pressure falls as the cerebral circulation improves and arteriosclerosis in most cases of persistent hypertension is not a widespread process but confined chiefly to the smallest arteries of the brain and kidneys. They feel that obstruction to the cerebral circulation is more concerned in hypertension than obstruction to the renal circulation.

Russell,[3] in 1909, as brought out by Reisman, held that the fundamental factor underlying both the ordinary faint and the epileptic fit is cerebral anemia. The ancients thousands of years ago were familiar with the fact that compression of the carotids produced coma. Fits have been produced in non-epileptic but definitely arteriosclerotic patients by carotid compression. This cannot be done in people with normal arteries.

I believe that Epilepsia Tarda is a rather distinct clinical entity depending upon a background of cerebral arteriosclerosis, probably in the brain stem, producing a cerebral circulatory inadequacy.

To label a case as one of senile epilepsy during an attack should never be done as there are a large number of conditions in which a convulsion may be a symptom. The chief diseases that may be ushered in by a convulsion in a patient above forty are apoplexy, general paresis, brain tumor, particularly of the frontal lobe, and uremia. But when patients have had more than one convulsion and between the attacks have been fairly comfortable, it is probable that they belong to one of the groups of epilepsia tarda.

The treatment is symptomatic, always bearing in mind the underlying pathological process. Attention should be paid to elimination. All psychological and bodily irritation should be eliminated as far as possible. The diet should be non-irritating in character with a reduction of proteids and salt. Of the drugs, luminal is always in order and digitalis when indicated.

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503 *Medical Arts Building.*

MECHANICAL METHODS AIDING LOCALIZATION OF SPINAL CORD COMPRESSION.*

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In recent years, the increase in our practical knowledge of the anatomy and physiology of the central nervous system and its surrounding fluid and membranes, has led to the development of several new mechanical and laboratory methods which offer material assistance to the clinical neurologist in improving the accuracy of his diagnosis of spinal cord tumors. Practically all these methods are dependent on the fact that a growth within the spinal canal blocks it to a greater or less degree, thus pre-

*Work done under the direction of Dr. Frederick P. Moersch, Section on Neurology. The Mayo Clinic. Submitted for publication July 12, 1928.

venting a free flow of cerebrospinal fluid within it. Extramedullary spinal cord tumor is perhaps the most common clinical cause of such block, although it may result from other conditions, such as fracture of a vertebra, extradural growths, and chronic arachnoiditis.

Since Quincke developed the technic of lumbar puncture in 1891, alterations in the cerebrospinal fluid in the presence of various pathologic changes have been studied extensively. It has been known since 1908[12] that if the spinal canal is blocked, fluid thus enclosed in loculi undergoes definite change probably the result of stasis, the most apparent of which are xanthochromia and rapid clotting due to increased protein content. Even in cases in which the canal is only partly occluded moderate changes of a similar nature take place.

Comparatively recent studies in the physiology of the cereberospinal fluid have shown that its circulation begins from the lateral ventricles, then through the several foramina to the subarachnoid spaces where it finds egress directly into the venous sinuses by way of the arachnoid villi and their various modifications. Its flow in the spinal canal is thus chiefly in the caudal direction, although there are some lesser currents of flow in the opposite direction. The enclosing membranes which contain the spinal fluid are semipermeable, and contain the fluid as in a closed sac. Any increase in pressure intracranially will thus increase the cerebrospinal fluid pressure throughout the sac and any such change in pressure may be noted through a lumbar puncture needle inserted in the canal. The common procedure of jugular compression, as demonstrated originally by Queckenstedt, by increasing the intracranial venous pressure indirectly increases the cerebrospinal fluid pressure which is readily measured by means of a manometer attached to a spinal puncture needle. It is evident also that, if a complete block exists in the spinal canal, jugular compression will not cause any change in pressure in the fluid distal to the block. If a partial block exists in the canal, a much slower rise in pressure occurs than if the canal were entirely occluded.

Several problems confront the neurologist when yellow spinal fluid with demonstration of a complete or partial block in the canal is encountered at the time of spinal puncture. The clinical history and course must give much weight to the ultimate conclusion as to the nature of the lesion within the canal. If surgery is considered, perhaps nothing is more important than a determination of the upper and lower levels of the block. The upper level can be estimated usually by careful clinical examination for which often there can be no substitute. But the lower level of the lesion usually defies clinical testing. At least three methods, other than the clinical have been developed by which the upper as well as the lower levels of the block within the spinal canal may be determined.

Multiple Spinal Punctures

The possibility of this method was demonstrated first in 1913.[8] It resolves itself to the performance of a series of spinal punctures in successive interspaces thereby determining the intervertebral space immediately above and below the tumor by the degree of promptness or absence of response of the fluid to jugular compression. Figure 1 illustrates the method diagrammatically. Puncture below a tumor

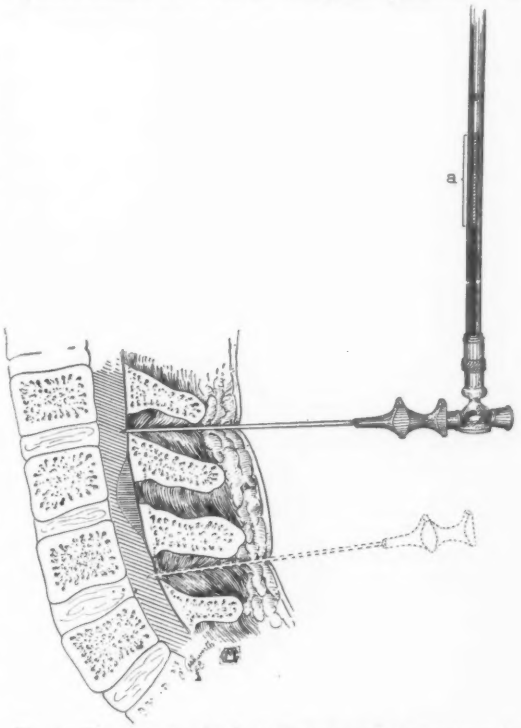

Fig. 1.—Diagrammatic sketch to illustrate multiple punctures in locating the level of intraspinal block. Needle (interrupted lines) below tumor yields yellow fluid and no response to jugular pressure (manometer not attached). Above tumor, needle (manometer attached) may yield clear or slightly yellow fluid with prompt response (a) to jugular pressure.

causing complete blockage of the canal will not respond to jugular compression; puncture above the tumor will give prompt response. If the puncture below the tumor yields a slow response to jugular compression, this offers sufficiently differentiating evidence to indicate the level of the lesion.

In performing multiple punctures above the level of the second lumbar vertebra there is always the possibility of passing the needle directly into the spinal cord and thereby doing more harm to the patient than the results might warrant. Such punctures must therefore be left to the expert. There is a possibility also that the needle may pass into the canal at the level of the tumor. If the growth is intramedullary and approximately fills the canal, even an experienced operator cannot avoid touching the cord with the tip of the needle. If the growth is extramedullary, the needle may strike a nerve root passing around the tumor and cause pain or paresthesia; it may fail to strike fluid, or it may produce bloody fluid. It may be possible to infer from some such difficulty that the level of the lesion has been reached.

Objection is often raised to multiple punctures due to fear of unnecessary trauma or pain. In proper estimation and defense of this method it should be stated that a skillful operator using local anesthesia can perform multiple spinal punctures practically without harm or pain to the patient. Similar punctures in the higher levels of the canal are much more difficult and it would perhaps be advisable in most cases to limit the method of multiple punctures in locating tumors to an area ranging from mid-dorsal to the sacrum if the operator is experienced, and in the lumbar region only, if the operator's experience is limited.

Forty Per Cent Iodized Oil

Forty per cent iodized oil was used first by Sicard and Forestier in 1921 to determine the level of compression within the spinal canal. It is composed of poppy-seed oil and iodine; and being opaque to the roentgen-ray is almost unique in indicating an intraspinal block. Since its introduction it has been employed extensively as an aid in locating spinal cord tumors. The perfection in technic of the cisternal puncture by Ayer, at approximately this same date pointed out the best available avenue for the insertion of the oil into the spinal canal.

The technic in administering the oil involves essentially that of cisternal and lumbar puncture. Following administration the oil may be observed passing down the canal by means of the fluoroscope. If the block is only partial, the passage of the oil is slowed, and its shadow deflected, sometimes fragmented, but altered unmistakably in any case. If the oil is not stopped in its passage, it eventually comes to rest in the caudal extremity of the dural sac at the level of the second sacral vertebra. Permanent roentgenograms of the descending oil may be taken at any level of its descent, or when it stops at a definite block, as in Figure 2, a roentgenogram taken in a case in which the oil was injected elsewhere prior to the patient's admission to the clinic. This roentgenogram will serve to illustrate some of the advantages and disadvantages in the use of the oil. The patient was a man, aged thirty-six, a worker in enamel, who three years prior to admission began to notice the gradual onset of an aching pain, or "lumbago", in the lower part of the back. Eleven months prior to admission he began to experience a dull pain in the right lower abdominal quadrant, and at the same time an extension of the pain in the back to the hips and the upper posterior part of the right thigh. A month later appendectomy was performed elsewhere, followed by slow convalescence. Two months after the operation, he attempted to resume work, but the old type

Fig. 2.—Lower lumbar vertebrae. Spinal cord tumor (40 per cent iodized oil injected elsewhere). Air may be seen extending to lower part of fourth lumbar vertebra (arrow).

of pain returned severely, this time in the posterior part of the thighs, extending to the level of the knee on the right side. Since then the pain had been constantly present, being aggravated at night, and by motion and coughing. Six months prior to admission he noticed that both lower extremities had become smaller, especially the right. He had grown progressively worse so that on admission he walked with crutches due to the "weakness in both kness". A diagnosis of sciatica was made elsewhere and foci removed. About a month prior to admission a cisternal injection of 40 per cent iodized oil was carried out, thus affording evidence of the nature of the lesion suspected. Neurologic examination showed gradual sensory loss beginning at the level of the first lumbar segment on the right and the third lumbar segment on the left with partial perianal preservation. Paralysis in the muscles supplied by the same roots was noted. Spinal puncture was performed in the interspace between the fifth lumbar and first sacral vertebrae. There was no response to jugular pressure, and the fluid was yellow and coagulated in a few minutes. Five cubic centimeters of fluid was withdrawn and an equivalent volume of air injected. The roentgenogram (Fig. 2) showed the oil, which had been injected elsewhere, lodged at the lower level of the third lumbar vertebra. The compression was diagnosed as present at a level extending from the lower part of the third to the upper part of the fourth lumbar vertebra. At operation a neurofibroma was found at the level diagnosed. An intraspinal portion, 2 by 1 by 1 cm., and an extraspinal portion, 5 by 2.5 by 1 cm., were found and removed. The oil had caused a severe reaction around the fibers of the cauda equina, "gluing" them together with many adhesions.

Forty per cent iodized oil with specific gravity lower than that of the spinal fluid may be used. It should be injected into the canal below the level of the tumor and allowed to rise. Roentgenograms will then reveal the level of the block if any exists.

Injection of Air

A third method to locate block in the spinal canal is afforded by the injection of air into the spinal canal below the level of the tumor. This procedure was suggested first by Dandy in 1919. It has been used infrequently since then in diagnosis.[1, 3, 4, 14, 15] Essentially the same method has been employed also at times in the treatment of various meningeal inflammations. The method has not been particularly popular in diagnosis, perhaps due to the fact that a complete spinal block is necessary before the procedure should be attempted; otherwise the air will pass the partial obstruction in the canal and locate in or about the cerebrum, in one of the ventricles or some part of the subarachnoid space and produce at least a severe headache.

The technic differs little from that of the ordinary routine lumbar spinal puncture. The puncture should be made as low in the canal as possible, preferably in the fifth lumbar to first sacral interspace. Absence of response to jugular compression must then be confirmed. Assuming that the tumor is mid-dorsal, fluid is then withdrawn to the amount of 10 to 20 c.c., 3 to 5 c.c. at a time, followed immediately by the injection of 3 to 5 c.c. of air. The head of the table may be elevated slightly during the operation. Roentgenograms of the spine are then taken antero-posteriorly while the shoulders of the patient are elevated 12 to 14 cm. above the horizontal position.

Fig. 3.—Lower dorsal and upper lumbar vertebrae. Spinal cord tumor. Air injection. Upper level of column of air at upper level of ninth dorsal vertebrae (arrow).

Figure 3 is the roentgenogram in a case of spinal cord tumor in which air was injected.

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The patient was a boy, aged seventeen, a high school student, who eighteen months prior to admission to the clinic had noticed the onset of weakness in the right lower extremity. Following a spinal puncture elsewhere, fifteen months after the onset, spastic paraplegia and sensory loss extending to the waist line developed within a few weeks. There was little progress in symptoms, and at the time of admission he presented the picture of spastic paraplegia without complications. He had not had pain and sphincter control was little affected. Neurologic examination showed complete sensory loss from the level of the tenth dorsal segment downward with spastic paraplegia. There was slight perianal sensory preservation. Spinal puncture showed a lack of response to jugular compression, and a yellow fluid coagulated within several minutes. On the removal of 10 c.c. of cerebrospinal fluid an equivalent amount of air was injected through the spinal-puncture needle inserted in the fourth lumbar interspace. The upper level of the air is shown at the upper level of the ninth dorsal vertebra. The lower level of the compression was thus diagnosed by injection of air as between the eighth and ninth dorsal vertebrae, and the upper level by clinical test at approximately the seventh dorsal vertebra. At operation an extramedullary neurofibroma was found in the right side of the canal "extending slightly over the dorsum of the cord but which had displaced the cord producing a marked depression opposite the intervertebral foramen between the seventh and eighth dorsal vertebrae".

Comment

If there is complete block of the spinal canal the method of choice is undoubtedly that of injection of air. The air is soon absorbed and does not leave a local reaction so far as is known, thus obviating the outstanding objections to the use of the oil. Only one puncture is required, which overcomes the chief objection to the multiple puncture method. Only the lower level of the tumor is visualized by this method, the upper requiring determination by careful clinical examination.

The use of 40 per cent iodized oil involves two serious objections, namely, the compound is not readily absorbed and its irritating properties may result in chronic inflammation and formation of scar tissue.[7, 9] Its ultimate fate, if it is allowed to remain in the spinal canal indefinitely, is not known.

If a partial block is present and if multiple punctures are not permitted, the clinician must rely on his clinical examination, and the use of 40 per cent iodized oil only as a last resort to aid localization. The clinician's problem

Fig. 4.—Dorsal vertebrae; air injection. Inoperable osteochondro-sarcoma in right side of chest, with upper level of spinal cord compression at the level of the fifth dorsal segment. Upper level of column of air at the level of the seventh dorsal vertebra (arrow).

in spinal cord compression is chiefly that of localization. Any method which increases the accuracy of this diagnosis with a minimum of risk to the patient, reduces the ultimate operative risk by diminishing the necessary extent of surgical trauma. There is no doubt that the three methods briefly reviewed here offer to the clinician valuable additions to his armamentarium when confronted with a growth which blocks the spinal canal and compresses the spinal cord.

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THE ACUTE ABDOMEN.*

By RICHARD H. MEADE, JR., M. D., University, Va.

In discussing such an inclusive subject as the acute abdomen one must set certain definite limits and keep within them. My object therefore is to describe briefly the chief components of the acute abdomen, then to point out the more important causes of it and some of the conditions often confused with it.

As I understand it, the term, "Acute Abdomen" refers to that type of abdominal disease which calls for more or less immediate surgical intervention. The outstanding characteristics are: abdominal pain; nausea and vomiting; tenderness; muscle spasm; and less frequently, distention, and mass formation. Of these, pain is the outstanding one and usually the first to appear. Now, it is known that pain may be caused by a number of different factors and, unless this is borne in mind, confusion is apt to occur. Very briefly stated, one may consider pain to be referred from the underlying structures to the abdominal wall by a simple spinal reflex as in the ordinary case of acute appendicitis, or it may be the result of a longer and more complex reflex as the abdominal pain occurring in certain cases of coronary occlusion. This mechanism also holds true for the associated tenderness and muscle spasm. Nausea and vomiting, however, bear no such close relationship to the site of trouble. Among the conditions that produce these latter symptoms are:—irritation of the sympathetic nervous system by the acute distention of a hollow viscus, or by the interference with the circulation of one of these; intestinal occlusion; overloading the stomach; and central irritation due to toxemia. Abdominal distention may be due to intestinal obstruction, or to toxemia as occurs in some cases of pneumonia. The presence of a mass is an occasional feature of the acute abdomen and may be inflammatory, neoplastic, or due to an enlarged organ. Fever and leukocytosis of some degree are also usually present.

John B. Deaver has aptly said, that without the presence of an abdominal operative scar one should think, first, last, and always of acute appendicitis as the cause of the acute abdomen. In the presence of such a scar one should think of acute intestinal obstruction due to an adhesive band. This dictum, I believe, holds true for all ages.

It is convenient in discussing the causes of the acute abdomen to take up first those conditions as found in childhood. In the newborn, intestinal obstruction is perhaps the commonest cause and this is due to some congenital anomaly.

In older children, the causes of the acute abdomen may be cenveniently grouped into the inflammatory, and the mechanical. Under the heading of the former come appendicitis, mesenteric lymphadenitis, and primary peritonitis. Under the second heading comes intestinal obstruction due either to intussusception or to incarcerated hernia. In a study of 400 patients under the age of thirteen, having acute abdominal disease, Cohen, of New York, found that 312 were due to acute appendicitis. Now, appendicitis in young children is more dangerous than in older patients due to the tendency to rapid involvement of the general peritoneum.

*Read in a symposium on, "The Abdomen," before the Albemarle County Medical Society, June 5, 1928.

Its prompt diagnosis and treatment are therefore of great importance. Furthermore, the diagnosis is usually harder than in adults because of the defects in the history. The story of the characteristic sequence of events, epigastric pain, nausea, diffuse pain, and then localization in the right lower quadrant of the abdomen may be difficult to elicit. Then, one must rely on the physical findings. Here the combination of tenderness and muscle spasm localized in the right lower quadrant, together with a mild fever and leukocytosis, point to the diagnosis in the early stage. When peritonitis has developed, the signs are too apparent to miss and the need for surgical intervention patent.

Often indistinguishable from acute appendicitis is mesenteric lymphadenitis, especially when the ileocecal glands are involved. This process may be due to infection from the tubercle bacillus, or from some pyogenic organism. Unfortunately, there are no pathognomonic signs and the diagnosis is generally made at the operating table. Except when suppuration has taken place there is no need for operative interference.

Primary peritonitis of the pneumococcus, or streptococcus, variety occurred in only ten of the 400 cases of acute abdominal disease referred to before, but, of the children in this group under five years of age the streptococcus type made up 7 per cent of all the cases. It is thought to be the most serious acute abdominal lesion occurring in children, carrying a mortality of 80-90 per cent. These facts would seem to justify its brief consideration here. Its abdominal period is preceded by evidence of an acute upper respiratory infection. Then the child suddenly becomes very ill with a temperature of 104° to 106°. There is severe abdominal pain and vomiting. In this early stage although there is diffuse abdominal pain, mainly in the lower portion, there is usually no rigidity of the abdominal wall and the symptoms may be thought to be referred from the chest, as evidence of the recent throat infection is usually present. The leukocyte count is high with an increase in the percentage of polymorphonuclears. The disease is rapidly progressive up to death which usually takes place within two weeks of the initial respiratory infection unless operative measures are effective. As there seems to be no tendency toward localization, early operation is indicated. No recoveries have been reported without it.

Of the causes of acute intestinal obstruction in children, intussusception leads the list. The history of a previously well child suddenly having paroxysms of acute abdominal pain with vomiting and varying degrees of shock, and later passing blood stained mucus by rectum, is a well known symptom complex. On examination, one finds a pale child lying quietly but at frequent intervals drawing up its legs and crying with pain. Its abdomen is distended and if one can palpate a mass in the course of the colon, or in the rectum, the diagnosis is established. Immediate surgical interference is of the greatest importance.

Incarcerated hernia makes up a much less important group but its possibility should always be borne in mind.

Before leaving the discussion of the acute abdomen in children, I must call attention to the frequency with which acute intrathoracic conditions are ushered in with abdominal symptoms. It is not infrequent that pneumonia first manifests itself in these young patients by abdominal pain, nausea and vomiting. Examination in this stage will show abdominal tenderness which may extend quite low down, and which may be associated with muscle spasm. However, this spasm is not constant and usually can be felt to disappear at the end of a deep breath. The diagnosis depends on the examination of the chest, and on the other evidences of respiratory tract infection.

When one attempts to consider the chief causes of the acute abdomen in adults, such a mass of material presents that the forest can hardly be seen for the trees. Accordingly only a few of those more commonly encountered will be considered. As previously quoted, appendicitis is easily the most common cause of the acute abdomen. And though we all come in contact with it so often and many feel that it is a simple affair, statistics show that the mortality from it is on the increase. From 1920 to 1925 there was an increase of over 30 per cent in the death rate per 100,000 of population. In 1920 there were 11 deaths per 100,000 of population whereas in 1925 there was 14.4 deaths per 100,000. Guerry, writing in 1926, pointed out that the mortality from appendicitis was equal to the combined

death rate from ectopic pregnancy, pyosalpinx, gall-stones, and diseases of the pancreas, spleen and thyroid gland. And it nearly equalled the combined rate for gastric and duodenal ulcer, intestinal obstruction and gall-stones. It has been said that each death from appendicitis is due to a blunder on somebody's part. Whether it is the fault of the patient, his parents, or his doctor, makes little difference to him but a great deal to us. I think that it is quite generally agreed that cathartics should never be given when there is the slightest possibility of appendicitis. For it has been repeatedly shown that the rupture of an appendix and the subsequent peritonitis has been due in many instances to the action of a cathartic. If the appendix can be attacked in its earliest state of inflammation, the mortality should approach zero, just as in diphtheria the mortality bears a definite relationship to the time at which the antitoxin is administered. However dark this picture may seem, the operative mortality from this disease is very low in the hands of experienced surgeons. Guerry in 1926 reported on 2,593 consecutive cases that he had handled with only 15 deaths, or a mortality of only 0.58 per cent.

As to the diagnosis, too great importance cannot be put upon the history. The onset of the pain in the epigastrium with later localization in the right lower quadrant is the rule and the pain practically always precedes the nausea. In the examination of the abdomen one finds definite involuntary muscle spasm and tenderness. Usually it is in the right lower quadrant with the point of maximum tenderness over McBurney's point, but may be shifted according to the location of the appendix. It is very important to palpate the abdomen gently and with the patient as relaxed as possible. When two people examine an abdomen, the second will find more spasm and at times this slight increase will be enough to establish a wrong diagnosis and cause a needless, or even harmful, operation. In regard to the leukocyte count, though it is usually elevated somewhat above normal, one should not depend on this nor on an elevated temperature for we not infrequently find a badly diseased appendix when count and temperature are normal. Of course, when rupture has occurred and peritonitis developed, the picture changes markedly and doubt as to the diagnosis of a surgical condition no longer exists.

In this part of the country at least, the most frequent condition simulating acute appendicitis in women is acute inflammation of the uterine adnexa. Though this condition is usually bilateral, it may be confined to one side and frequently the manifestations are unilateral. When the right side is thus the seat of the signs and symptoms, considerable difficulty may arise in establishing the correct diagnosis. However, the history is of great importance and may be the deciding factor. Pre-existing leukorrhea, or more definite stigmata of gonorrhea, can usually be found. The pain rarely starts in the upper abdomen but is confined to the lower portion and tends to shift from side to side. The patient appears quite ill and usually has a rather high temperature and leukocyte count. There may be nausea and vomiting. The important diagnostic signs are: very low abdominal tenderness and muscle spasm, and the positive pelvic findings. In addition to the purulent vaginal discharge one finds by bimanual examination tenderness with, or without, induration and masses in the vaginal fornices. Movement of the cervix reproduces the abdominal pain. Although salpingitis is rarely met with in young children, several cases have been reported and its possibility must therefore be kept in mind. It is quite generally agreed that operation during the acute stage of salpingitis is unwise and its differentiation from acute appendicitis is therefore important.

While dealing with pelvic disease, one must consider ovarian cysts and pedunculated fibroids having twisted pedicles. Here the diagnostic point is the finding of a movable mass in the pelvis by bimanual palpation, and the origin and persistence of the pain in the lower abdomen. Of course when infection and peritonitis develop, the exact diagnosis may be impossible but the indication for immediate operation is apparent.

In ectopic pregnancy, the history of a delayed period is helpful, but not essential. The lower abdominal pain is severe and lancinating and inconstant. There may, or may not be vaginal bleeding. Of course when rupture takes place, the symptoms and signs of intra-abdominal hemorrhage dominate the picture and a real surgical emergency is apparent. Before the occurrence of this tragedy, examination shows a variable amount of low unilateral abdominal tenderness and muscle spasm.

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Bimanual examination reveals a soft cervix with moderate enlargement of the uterus and a mass in one vaginal fornix. This mass is tender but not as markedly so as in pelvic inflammation. The temperature and leukocyte count are normal, or only mildly elevated.

Sigmoid diverticulitis is more apt to be confused with a left-sided pelvic infection in women than with anything else, although the condition is twice as common in men. It usually occurs in the middle-aged, or older, and ordinarily there is a history of bowel disturbance. However, the case with definite abscess formation following the rupture of a diverticulum may be indistinguishable from a left pyosalpinx.

In the upper abdomen the differential diagnosis of acute conditions is especially important and especially difficult. The more or less typical cases of gall-bladder disease, and of perforated peptic ulcers, may be readily recognized but the atypical ones are only too easily confused with one another and with thoracic disease. However, as the acute upper abdominal lesions all demand immediate surgery, I shall not take the time here to discuss their differential diagnosis but hurry on to the lesions above the diaphragm which may so closely simulate them.

Although anginal attacks may be entirely abdominal, the past history added to the paroxysmal nature of the pain and other evidences of circulatory disease will usually establish the diagnosis. Pleurisy, especially when diaphragmatic may, and not rarely does, cause a needless operation. In the absence of positive chest findings, the history and the appearance of the patient are our only helps. Pneumonia may be equally baffling but usually the abnormal thoracic signs and respiratory changes are present. Now, the condition spoken of in the newspapers so often as the cause of death of a prominent person, "Acute Indigestion", is more scientifically recognized as coronary occlusion. This condition with its subsequent cardiac infarction produces symptoms which often are entirely abdominal and of the most distressing nature. Because of this frequent unhappy confusion it seems important to consider here its outstanding characteristics. The past history may, or may not, be positive for evidences of cardiac disease, though frequently there have been anginal attacks. The onset is sudden without warning. There is excruciating pain in the precordium or in the epigastrium, which usually radiates to the shoulders and down one or both arms. The pain is constant, lasting for hours or even days, and relief seems impossible. Dyspnoea then usually develops, followed by nausea and vomiting with associated weakness which may simulate true shock. On examination, one is impressed with the fact that the symptoms seem out of all proportion to the physical findings. The skin is ashen in color, moist, and cold, and the patient has an anxious expression. The lungs may show signs of circulatory failure, the heart may show enlargement and infrequently a pericardial friction rub, but almost invariably the sounds are weak. Irregularities of rhythm at times occur and the electrocardiagram may be of help. The systolic blood pressure is almost invariably lowered. The abdomen may show marked tenderness and muscle spasm in the upper portion and when this is associated with an enlarged liver the similarity to gall-bladder disease is striking. Fever and leukocytosis are constant. So often has coronary occlusion been mistaken for cholelithiasis that an interesting study of the two conditions was carried out in 1924 by Faulkner, Marble, and White in Boston. Studying 30 cases of coronary occlusion confirmed by autopsy and 30 consecutive cases of cholelithiasis confirmed by operation, they noted the following important distinguishing features: In regard to age the youngest patient with coronary disease was forty-two whereas there were 12 patients with gallstones under this age. Coronary occlusion was four times as frequent in men, while the reverse was true for the other condition. The previous history of anginal attacks was strong presumptive evidence of coronary disease. Radiation of pain to the arms was in favor of the cardiac lesion whereas radiation to the back was more common in the gall-stone cases. Furthermore, the sense of constriction so frequent in the cardiacs was never found in the gall-bladder cases. As mentioned before, the pain in coronary occlusion is constant but in cholelithiasis usually occurs in attacks. Evidence of cardiac failure and the presence of weak heart sounds are very much in favor of coronary occlusion.

Before closing this rambling account, I must at least mention several other conditions that may give symptoms resembling the acute ab-

domen. First in this list comes pyelitis which in the absence of pyuria is often confused with acute appendicitis. The difference in the onset, fever and malaise often preceding the pain, and the development of the symptoms, is usually helpful as is the fact that the pain in pyelitis is usually more lateral and involves the back, and is associated with costo-vertebral angle tenderness. Herpes zoster in the pre-eruptive stage can usually be recognized by the limitation of the tenderness to a definite nerve distribution. Typhoid fever in the first two weeks can give confusing abdominal signs and the diagnosis depends on the recognition of the underlying disease. Lead colic and tabetic crisis may cause such severe abdominal pain that the characteristic changes in the blood and the lead line in the former, and the altered reflexes in the latter, may be overlooked. The acute intestinal upsets spoken of as ptomaine poisoning, or cholera morbus, cause severe abdominal pain but the history of a dietary indiscretion, the diarrhoea, and the relief of pain produced by pressure and massage of the abdominal wall usually save the patient from a needless operation.

Perhaps the best conclusion that can be drawn from these remarks is that the diagnosis of the Acute Abdomen is full of pitfalls and the best way to avoid them and thus cut down the mounting mortality is for early and close co-operation between internists and surgeons in all doubtful cases.

Correspondence

Interesting Meeting of Virginia Tuberculosis Association.

To Members of the Medical Society of Virginia:

The Virginia Tuberculosis Association will hold its annual meeting on February 28, 1929. As a part of the program of this meeting there will be an open session at 8:00 P. M., in the Parish House of St. Paul's Church, Richmond, Va. The main event of this open session will be an address by Dr. Kendall Emerson, the new Managing Director of the National Tuberculosis Association.

Dr. Emerson is especially distinguished in this particular line of work. He is graduate of Amherst College and the Harvard University Medical School, and for the past several years the chief of the surgical service of Memorial Hospital, Worcester, Mass. Dr. Emerson is a member of the American College of Surgeons. During the World War he served as a major in the Royal Army Medical Corps until America entered the war, when he became a major in the Medical Corps of the U. S. Army. Following the war he was special commissioner of the American Red Cross to Siberia. For three years he was President of the Massachusetts Tuberculosis League.

Dr. Emerson will pay especial attention in his address to the future of surgery in tuberculosis, what must be done in the future in the way of preventing and controlling tuberculosis, and the present status and future functions of sanatoria. I am sure this address will be instructive and of great interest to the medical profession of the state, and am urging all of the members of the Medical Society who are able to do so to try to be in Richmond on this occasion and attend this meeting.

J. Bolling Jones,
President, Medical Society of Virginia.

Roentgenology

Roentgen-Ray Diagnosis

LEOPOLD JACHES, M. D., Radiologist, Mt. Sinai Hospital, New York City.

(*Continued from page 740*)

The Reproductive Organs

In gynecology and obstetrics the roentgen-ray was until recently of comparatively little value in diagnosis. Occasionally a fibroid tumor was discovered by calcification within it, or a dermoid cyst of the ovary by the presence of rudimentary or well formed teeth. Sometimes a fetus can be shown in the early months of pregnancy, as a rule not before the third month. In later months the position of the fetus and the number, in case of twins or triplets, may be learned.

With the introduction of pneumoperitoneum it became possible to demonstrate the pelvic organs, the patient being placed in an extreme Trendelenburg position to allow the gas to fill the pelvis.

In 1919, Rubin began to use the roentgen-ray for the determination of the patency of the fallopian tubes. This is done by injecting into the uterus a gas which escapes into the peritoneal cavity if one or both tubes are patent. Following this, fluoroscopy or roent-

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genography is done with the patient in the upright position. If the gas is found under the leaves of the diaphragm, then at least one fallopian tube is patent. It is not possible by this method to say which it is or if both are patent. It has been found safest to use carbon dioxide because it is absorbed most rapidly. This procedure is contraindicated in acute or subacute disease of the adnexa because of the possibility of infection; another contraindication is a degenerated fibroid.

Within the last few years Rubin and others have used injections of iodized oil in the study of the anatomy and function of the uterus and tubes.

Pneumoperitoneum

Most of the special methods used in conjunction with roentgen-ray examinations have been referred to while dealing with the skull, chest, urinary tract and gynecologic conditions. One method, however, that was briefly referred to in connection with eventration of the diaphragm, namely, pneumoperitoneum, ought to be mentioned here, as it is of great aid in properly selected cases for the demonstration of intra-abdominal disease which cannot otherwise be determined. The most important is adhesions between abdominal viscera and the parietes, sometimes between each other. Subphrenic effusions can be better demonstrated in doubtful cases, also irregularities in the outline of the liver, enlargement of the spleen, occasionally kidney tumors, and retroperitoneal masses. As this procedure is fraught with a none too negligible risk to the patient, it should be resorted to only when absolutely necessary and other means of diagnosis have failed.

Conclusions

The foregoing sketch should not be concluded without commenting on the present-day tendency of clinicians to equip their offices not only with fluoroscopes but with complete roentgen-ray diagnostic outfits. The technical work is generally done by the office nurse, who has received her hasty instruction from the manufacturer's salesman; at best, a lay technician who has had a somewhat better training presides over the apparatus. The result in the majority of cases is technically poor films interpreted by roentgenologically ill prepared diagnosticians. While the technical difficulties might be overcome the interpretation of the roentgenograms will continue to have its difficulties, because the clinician has neither the time nor the opportunity to acquire the necessary skill and experience.

The supposed advantage in favor of the clinician is his knowledge of the clinical aspects of the case. This is more than overcome by the natural tendency to favor an interpretation which bolsters up a clinical preconception, and by the unavoidable lack of knowledge of general roentgen-ray pathology with the consequent failure to observe pathologic conditions other than those looked for. As one of many examples, the following case may be cited: A gastro-enterologist who makes his own roentgen-ray diagnosis consulted a roentgenologist as to the nature of a concretion on a film of the urinary tract, but he had overlooked an advanced degree of carcinomatous metastasis in the lumbar spine and pelvis. Similar cases could be cited ad infinitum.

The roentgenologist, on the other hand, has or should have an up-to-date knowledge of roentgen-ray pathology as affecting all parts of the body and all pathologic conditions, and is therefore on the alert for all changes shown on the roentgenogram, whether suspected from the clinical history or not. His lack of familiarity with the patient's history can be overcome by co-operation between him and the clinician.

Serious as the situation is from the standpoint of the patient, who is not apt to obtain the best result to which he is entitled, it is more serious than the standpoint of the development of roentgenology as a diagnostic means. Today, the young man who has the desire to devote himself to roentgen-ray diagnosis is discouraged to find that as a specialist he will be unable to earn his livelihood. As a consequence, many a young physician who would have become a good roentgenologist seeks another medical specialty, and roentgenology is the loser. While the part played by a few clinicians in the development of roentgen-ray diagnosis cannot be denied, it is nevertheless true that most progress in this field has come and must come from those who devote their entire time and energy to it alone.

It is curious that a clinician who would not risk diagnosing the gross lesions found on the operating or the postmortem table will not hesitate to diagnose the shadows such lesions cast on a roentgenogram. Perhaps it can be explained psychologically. In roentgen-ray

diagnosis a photographic plate or film is used, the result is a "picture," and what is easier than looking at a picture? There is hope that the time will come when it will be realized that interpreting the meaning of the shadows seen on the roentgen-ray "picture" requires as much skill and study and experience as the interpretation of the picture seen through a microscope.

We again wish to thank both the author and *The Journal of the American Medical Association* for permission to reprint these articles.

Analyses, Selections, Etc.

"The Common Cold": Etiology, Prevention and Treatment.

Volney S. Cheney, M. D., in a paper on this subject in the *American Journal of Public Health*, January, 1928, first shows statistically the importance of the "common cold." Sickness causes much more loss of time from work than does accidents. The "common cold" and its sequelae, he considers, is responsible for 45 per cent of the loss of time in large industries. It is his opinion that the "common cold" is a disease of civilization, that it is not infectious, but that the cold, or symptoms of the cold, are only a local manifestation of the general systemic disturbance, that all colds are nothing more or less than a manifestation of acidosis.

The author has attempted many times to produce colds by inoculation, but has never been successful. He explains the higher incidence of colds in winter as due to the loss of part of the active effect of the ultra-violet rays of the sun. This loss, he says, is chiefly shown in the calcium content of the blood. The only influence of climatic variations is to limit our activities, cause us to eat too much and exercise too little.

In his experience the highest incidence of the cold occurs on Monday. This, the author attributes to over-eating and over-drinking, especially alcoholic fluids, and fatigue. He gives great importance to fatigue as a contributing factor, and attributes its importance to altered metabolism.

A number of colds were studied by him in the laboratory. The acidity of the urine, the CO_2 combining power of the blood, calcium content of the blood, the sugar content, and non-protein nitrogen and the basal metabolism were studied. He reports that acidity of the urine was always high, the CO_2 combining power of the blood was always low and the sugar content of the blood was always low. These studies lead the author to the opinion that the "common cold" is nothing more than a mild acidosis. He supports this theory by the statement that all colds can be aborted, or cured, by proper alkalinization. Also, that symptoms varying from those of the "common cold" to the severe Flu can be produced by the administration of ammonium and calcium chlorides. The symptoms rapidly disappear upon the administration of sodium bicarbonate.

An Abortive Treatment

If the disease is attacked, he affirms, when there is a beginning dryness in the pharynx or a slight coryza, or congestion of the mucous membrane of the nose, and alkalinization is instituted by large doses of sodium bicarbonate, until the urine is alkaline to litmus paper, a "cold" can always be aborted. Along with the sodium bicarbonate which he generally prescribed 8 in 60 g. doses, accompanied by a large glass of hot water, every 2 hours for 3 doses, he gives to an adult 1 g. of calcidin a calcium and iodine combination every half hour until 6 doses have been taken.

As most colds begin to manifest themselves late in the afternoon or early evening he thinks the abortive treatment is best given at this time up to retiring. At the time of taking the treatment, the usual meal should be dispensed with, or should consist of milk and some cereal, or soup or broth. If the bowels are constipated, a cathartic or laxative should begin, but the lower bowels should be relieved by a soap suds enema. This treatment will abort colds, if taken in their incipiency.

Prophylaxis is best maintained by exercise and a diet which is well balanced and thoroughly adapted to the individual's physical activities, the author says.

Conclusions

This author feels that colds and their sequelae, including rhinitis, pharyngitis, laryngitis, bronchitis, la grippe, influenza, and pneumonia are not infectious, as one generally considers a disease to be infectious, but are due to a disturbance of the alkaline reserve or bal-

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ance (acid-base equilibrium). The more severe the degree of disturbance, the more serious the disease.

He thinks conditions capable of producing a milk acidosis or disturbing the "buffer" action of the blood plasma, are contributing factors in producing a cold; a poorly balanced diet, lack of exercise, fatigue, constipation, and infections anywhere in the body. Colds can be prevented by maintaining the alkaline balance through proper diet, exercise, and the careful use of sodium bicarbonate or alkaline waters.

Colds can be aborted by administering sodium bicarbonate in doses large enough to thoroughly alkalinize the system together with small doses of calcidin or iodine calcium.

Colds can be cured by the administration of the same drugs in smaller and frequently repeated doses.

EDITOR'S NOTE:—This abstract is printed not because we agree with the author's statements, that "colds" are not infectious, but because of the approach to the problem of the etiology of "colds" from another angle than infection.

Miscellaneous

Poetical Bacteriology.

In the recent final examination in bacteriology given by Dr. E. C. L. Miller at the Medical College of Virginia, one of the questions gave a list of words and the students were told to write a story in which they should incorporate and underscore the words.

Because of its originality, we are publishing the following which was turned in by one of the students, Mr. John M. Preston:

PASSING OF THE TRIBE OF HIAWATHA.

(With apologies to Longfellow.)

By the shores of Gitchegumis,
By the shining deep sea water,
Stood the wigwam of Nicomis—
Daughter of the moon—Nicomis,
And her grandson, Hiawatha.

* * * * * *

Now the lad is grown to manhood,
Versed in all the forest knowledge,
Skilled in all the ways of hunting—
Strongest of his tribe and swiftest.

Learning now the ways of white men,
Learning of the white man's vices
And his disregard of nature,
Were his tribesmen retrogressing.

Then the valiant Hiawatha
Went thru all the forest calling,
Calling all his fellow tribesmen,
Warning them against the white man,
Warning them of sure destruction.

But the warriors would not heed him,
Drank the white man's firewater,
Sold him skins for beads and trinkets,
Learned to love the white man's vices.

Then there came the plague among them,
Pestilence and sickness raging,
Raging thru the leafy forest,
Thru the land of Hiawatha.

Then the warriors sought his council,
Penitent for their abuses,
Glad to do his slightest bidding,
That might cause the plague to slac'ken,
That might bring relief from suff'ring.

So the noble Hiawatha
Took them to the white man's doctor,
To the white man's lab'ratory,
There to test for black infection
And to fight the plague's destruction.

So the doctor drew some *serum*,
From a guinea-pig, drew serum,
And he called it "*complementum*."

Next he drew some from a rabbit,
From an immunized rabbit,
Immunized to sheep's red blood cells,
Immunity before developed
By injection of sheep's blood.

From a bottle took some liquid
Which he called an *antigen*.
Mixed these three and incubated,
Incubated thirty minutes.

Added next some Indian serum
Which might hold an *amboceptor*,
Syphilitic amboceptor
Which would make it full fixative,
Giving then a Wassermann
With a "four plus" standard reading.

One brave took an *antitoxin*
To relieve his throat's infection
Caused by streptococcic *toxin*,
Caused by diphtheritic toxins,
For his blood was quite unable
To combat the throat infection;
To *inactivate* the toxins.

Tho' another one had syphilis,
Yet the test was unresponsive,
For his serum wasn't normal;
Caused a complement fixation
So the reading was not valid:
Neither tube had *hemolysèd*.

With other ails the white man's doctor
Tried the tests of *flocculation*,
Tried also *agglutination*,
Even tried *precipitation*,
Finding many troubles brewing
In the tribe of Hiawatha.

But the doctor, never tiring
Gave to some a potent *vaccine*,
Gave to some a weakened vaccine;
With attenuated *virus*,
With a slowly acting virus
Building up the *antibodies*.

Then the saddened Hiawatha
Took his braves back to the forest;
To the dense and leafy forests,
To the dark and dreary shadows.
Sad of heart was Hiawatha,
Sad to know his braves were dying.

Glad also, was Hiawatha,
Glad to know the white man's doctor;
Thankful for the plague's arresting,
Thankful for the work of science.

Hiawatha's days were numbered,
And his tribe was weak and scattered.
Old age now had crept upon him
And the burdens of a chieftain
Were too much for him to carry.

Hiawatha left the forest,
Left the shores of Gitchegumis,
Glided thru the purple shadows,
Glided thru the lingering twilight
To the quiet of Nirvana.

Woman's Auxiliary, Medical Society of Virginia

The Woman's Auxiliary to the Post-Graduate Medical Society

Met in Petersburg, January the 8th, with the new president, Mrs. Herbert C. Jones, of Petersburg, in the chair. At this meeting it was reported that seven six months' subscriptions to *Hygeia* had been sent to white schools in Petersburg and one in Hopewell. Other work reported was that sunshine boxes had been sent on Christmas Day to Mrs. C. S. Dodd and to Dr. E. L. McGill.

Mrs. Philip Jacobson and Mrs. Randolph McCutcheon, both of Petersburg, were welcomed as members.

The President asked for ideas about entertaining the nurses of the Petersburg Hospital and there was quite a bit of discussion about organizing a Visiting Nurses' Association. It was stated that Miss Alice Duggan would speak at the next meeting on this subject.

The following were appointed as chairmen of the various committees for 1929:

1. Legislation—Mrs. E. J. Nixon.
2. Hygeia—Mrs. George H. Reese.
3. Hospital Supplies—Mrs. C. T. Jones.
4. Pubilicity—Mrs. Meade Edmunds.
5. Health—Mrs. William F. Drewry.
6. Membership and Courtesy—Mrs. J. Bolling Jones.
7. Entertainment—Mrs. W. B. McIlwaine.
8. Telephone—Mrs. Philip Jacobson.

The County Chairmen appointed for this year are:

Prince George—Mrs. S. E. Gunn, Hopewell.
Dinwiddie—Mrs. G. S. Fultz, Butterworth.
Nottoway—Mrs. J. A. B. Lowry, Crewe.
Brunswick—Mrs. E. R. Turnbull, Lawrenceville.
Greenesville, Mrs. G. M. Naff, North Emporia.
Sussex—Mrs. H. G. Stoneham, Waverly.
Surry—Mrs. F. E. Steere, Claremont.

After the business meeting, Mrs. C. T. Jones and Mrs. W. B. McIlwaine took over the social part of the meeting and served tea and cakes.

The Truth About Medicine

In addition to the articles enumerated in our letter of November 24th, the following have been accepted:

Abbott Laboratories
  Ampules Dextrose, 20 c.c.
  Ampules Dextrose, 50 c.c.
  Tablets Cinchopen—Abbott, 5 grains.
Armour & Co.
  Concentrated Liver Extract—Armour.
Eli Lilly & Co.
  Ephedrine Hydrochloride—Lilly.
    Pulvules Ephedrine Hydrochloride, ⅜ grain.
    Pulvules Ephedrine Hydrochloride, ¾ grain.
    Solution Ephedrine Hydrochloride—Lilly, 3%.
MacDowell Bros.
  MacDowell's Wheat-Nut-Casein Dietetic Flour.
Merck & Co., Inc.
  Bromipin 33 Per cent.
H. K. Mulford Co.
  Pirquet Test for Tuberculosis (Bovine Type).
  Tuberculin Ointment (Moro Ointment) (Bovine Type).
  Tuberculin Intracutaneous (Bovine Type).
  Antivenin (Bothropic).
National Drug Co.
  Diphtheria Antitoxin.
  Normal Horse Serum.
  Pertussis Vaccine.
  Pneumococcus Vaccine.
  Rabies Vaccine—Human (Semple Method).
  Smallpox Vaccine.
  Staphylococcus Vaccine.
  Tetanus Antitoxin (Concentrated).
  Typhoid-Paratyphoid Mixed Vaccine.
  Typhoid Vaccine.
  Antistreptococcic Serum.
  Typhoid-Paratyphoid A Vaccine.
Parke, Davis & Co.
  Scarlet Fever Streptococcus Toxin for Preventive Immunization—P. D. & Co.
E. R. Squibb & Sons
  Sulpharsphenamine—Squibb, 0.9 Gm., Ampoules.
  Tablets Ephedrine Hydrochloride—Squibb, ⅜ grain.
  Tablets Ephedrine Hydrochloride—Squibb, ¾ grain.

XUM

NEW AND NON-OFFICIAL REMEDIES.

Syrup Ephedrine Hydrochloride (Double Strength)—Swan-Myers.—It contains ephedrine hydrochloride—Swan-Myers (New and Non-official Remedies, 1928, p. 176), 0.4390 Gm., in 100 c.c. (¼ grain per fluidrachm) and alcohol 12 per cent. Swan-Myers Co., Indianapolis.

Squibb's Mint-Flavored Cod-Liver Oil.—Cod liver oil—Squibb (New and Non-official Remedies, 1928, p. 253), containing 0.67 per cent of oil of spearmint as flavoring. E. R. Squibb & Sons, New York.

Tetanus Antitoxin (Bovine).—A tetanus antitoxin, concentrated (New and Non-official Remedies, 1928, p. 357), derived from the blood serum of cattle immunized against the toxin of B. *tetani*. Marketed in packages of one syringe containing 1,500 units (one immunizing dose). H. K. Mulford Co., Philadelphia.

Capsules Ovarian Substance, Desiccated—P. D. & Co., 5 grains.—Each capsule contains 5 grains of ovarian substance, desiccated—P. D. & Co., (New and Non-official Remedies, 1928, p. 290). Parke, Davis & Co., Detroit.

Tablets Whole Ovary—Lederle, 2½ grains.—Each tablet contains 2½ grains of whole ovary—Lederle (New and Non-official Remedies, 1928, p. 292). Lederle Antitoxin Laboratories, New York.

Rabies Vaccine—Gilliland (Semple Method).—An antirabic vaccine (New and Non-official Remedies, 1928, p. 363) prepared according to the general method of David Semple (phenol killed). Marketed in packages of fourteen syringes each containing 2 c.c. The Gilliland Laboratories, Inc., Marietta, Pa.

Antipneumococcic Serum. Type I.—This antipneumococcus serum (New and Non-official Remedies, 1928, p. 361), is also marketed in packages of one 50 c.c. gravity container. E. R. Squibb & Sons, New York.

Antistreptococcic Serum—Squibb. This antistreptococcus serum (New and Non-official Remedies, 1928, p. 362) is also marketed in packages of one 50 c.c. gravity container. E. R. Squibb & Sons, New York. (Jour. A. M. M., December 8, 1928, p. 1805).

Salyrgan.—Mersalyl.—Sodium { o-[hydroxymercuric-methoxy-propylcarbamyl] phenoxy }acetate.—Salyrgan contains 39.6 per cent of mercury in non-ionizable form. Salyrgan has been demonstrated to exert a destructive action on the spirochæte of syphilis in rabbits, but is used chiefly as a diuretic. It induces diuresis only provided sufficient renal tissue is still intact and is therefore contraindicated in acute diseases of the kidney as well as in advanced nephritis. It is effective in ascites and edema of cardiac and cardiorenal origin; also in ascites resulting from cirrhosis of the liver. Salyrgan is supplied only in the form of a 10 per cent solution in ampules of 1 c.c. and 2 c.c. H. A. Metz Laboratories, Inc., New York.

Bromipin 33 Per Cent.—Brominized Sesame Oil 33 Per Cent—Merck.—A bromine addition product of sesame oil, containing from 31 to 35 per cent of bromine in organic combination. It acts like the inorganic bromides. The combination is not broken up in the stomach; but a portion of the bromine is split off in the intestine; the remaining compound is readily absorbed and largely deposited in the tissues where it is slowly split up. The product is also used as a contrast medium for roentgen diagnosis of the tracheo-bronchial tree. It is stated to be applicable in cases of mild or medium tuberculosis in which the use of an iodized oil is contraindicated. Merck & Co., Inc., Rahway, N. J. (Jour. A. M. A., December 22, 1928, p. 1995).

PROPAGANDA FOR REFORM.

Phenylaminoethanol Sulphate.—The Council on Pharmacy and Chemistry publishes a preliminary report on phenylaminoethanol sulphate, which has recently been synthesized, and studied pharmacologically and clinically and proposed for use as a substitute for ephedrine. The A. M. A. Chemical Laboratory examined a specimen of the product used for the recent clinical work and found it to be a pure substance having the composition claimed. Although the Council will await confirmatory reports before accepting the substance for New and Non-official Remedies, it believes that the results already recorded justify further experimentation clinically. To avoid confusion, the Council has adopted the name "phenylaminoethanol sulphate." (Jour. A. M. A., October 6, 1928, p. 1037).

Irradiation and the Blood.—The enthusiasms that have been aroused by the demonstrable physiologic potency of irradiation with ultraviolet rays generated in various ways call for restraint before they are permitted to promote therapeutic procedures that may presently be discovered to be ill-advised. Not long ago it was shown that the exposure of dogs to carbon arc radiation may give rise to variable results with respect to the changes in the content of erythrocytes in the blood. Depending on the dosage, increases and decreases were noted. A continuation of this work shows that changes in the plasma volume also may take place. The investigators believe that erythrocytes may actually be destroyed by excessive irradiation with massive exposures. Our uncertain knowledge in regard to the effects of irradiation should serve as a warning against undue ventures that may actually border on quackery, until further explicit knowledge is available. (Jour. A. M. A., October 6, 1928, p. 1038).

Liver Treatment in Sprue.—From reports it appears that anemia of sprue in which there is a high color index and fewer than 2,000,000 erythrocytes can be expected to respond to the administration of Minot's liver fraction (Liver Extract No. 343, N. N. R.), with a shower of reticulocytes, unless the bone marrow is hypoplastic. Clinical cure, apparently, follows, but the type of pernicious anemia persists for at least two months after liver extract has been administered. A recent report of a case of sprue treated with Liver Extract No. 343, N. N. R., refers to a patient who was admitted to the hospital in a moribund condition and who has apparently recovered completely. (Jour. A. M. A., October 6, 1928, p. 1038).

The Precursor of Vitamin D: Ergosterol.—Following the discovery that foods may be made antirachitic by irradiation with untraviolet light, it was shown that the substance which is activated by the rays is ergosterol. A precursor to Vitamin D had thus become established. Activated ergosterol was shown to be a hundred thousand times as effective from the standpoint of its effects on rachitic animals, as cod liver oil. This irradiated ergosterol needs careful standardization and evaluation in terms of curative potency, because an excessive dose may cause "hypermineralization" in the blood in the normal as well as the rachitic infant. The usual dose in infants for cure thus far has been given in the form of oil solutions containing the equivalent of from 2.5 to 5 mg. of irradiated ergosterol. Evidence has been presented which strengthens the assumption that only a molecular structure such as that possessed by ergosterol enables a sterol to be photo-chemically converted into Vitamin D, and confirms the view that ergosterol is the specific parent substance of Vitamin D. Fortunately, there

need be no limitations to its availability for therapeutic use if this is finally established on a sound basis. (Jour. A. M. A., October 13, 1928, p. 1110).

Cleaning the "Dental Augean Stables."—For years the dental profession, as the medical profession before it, has had its share of "peddlers" of worthless nostrums and quack remedies. Therefore the recent action of the American Dental Association, pointing toward the establishment of a bureau of chemistry for the examination of dental drugs is noted with satisfaction. The American Dental Association will render a public service by exposing many of the worthless "dentrifices," "mouthwashes," "pyorrhea remedies" and what not purveyed to the public. Equally important and a more fertile field for activity are the so-called ethical remedies. The American Dental Association proposes the establishment of its own council on pharmacy and chemistry. Congratulations to dentistry in its campaign to clear the "Augean stables" of dental materia medica. (Jour. A. M. A., October 13, 1928, p. 1113)

Benzyl Alcohol as a Local Anesthetic.—Benzyl alcohol is probably not needed as a local anesthetic, in view of the superior anesthetic qualities of other bodies. It is relatively more irritating and its action of shorter duration than that of non-volatile agents. (Jour. A. M. A., October 13, 1928, p. 1131).

Ovarialhormon Folliculin Menformon.—The Council on Pharmacy and Chemistry reports that an ovarian preparation made on the basis of the work of Laqueur, is marketed as Ovarialhormon Folliculin Menformon by two European firms and the product of one of these is marketed in the United States by the Marvell Pharmacal Co., New York. According to the information received, the commercial product may be obtained (a) from the placenta of women and animals, (b) from the liquor folliculi of cattle and (c) from the urine of pregnant women. Laqueur states that Menformon may be obtained from the urine and testes of men. The methods which were given the Council were so general in character that they could not be taken as establishing the character or identity of Ovarialhormon Folliculin Menformon. The Council reports that it was unable to obtain evidence of the efficiency of the preparation in the strength in which it is marketed. The Council has postponed consideration of the acceptance of this product for New and Non-official Remedies to await confirmative evidence for its therapeutic value and more definite information with regard to the identity of the product. (Jour A. M. A., October 20, 1928, p. 1193).

Ovarian Hormones and Ovarian Organotherapy.—The evidence from the experimental laboratories and the clinics, accumulated especially during the last few decades, points to the conclusion that the mammalian ovaries exercise their influence on the so-called secondary sex characters and the sex life of the mammalian female through the mechanism of the hormone or hormones produced by some element in the ovary. It is therefore rational to treat or attempt to treat symptoms due or presumably due to ovarian insufficiency by substitution therapy. Summing up the extensive clinical trials with ovarian preparations, generally administered orally, Novak, in 1924, stated that the results are rarely striking and often nil to the level-headed observer. Much work has been done on the separation and concentration of the so-called follicular ovarian hormone and preparations have been obtained which, when administered parenterally, are reliably reported to stimulate uterine growth and to introduce changes similar to estrus in spayed animals. To date the use of such preparations on patients has been neither extensive nor encouraging. The various ovarian hormone preparations that now seem sufficiently purified to be introduced hypodermically without serious results to the patients should be given trial in definitely uncomplicated ovarian deficiency in order that more may be learned as to their actual effects. (Jour. A. M. A., October 20, 1928, p. 1194).

Mu-Sol-Dent.—This is marketed by the V. B. Corporation of Pittsburgh, Pa., as "the only existing non-irritating efficient solvent of mucin and mucus." It is said to be "efficient in the prevention and treatment of sore throat and colds" and a product that will greatly hasten the healing of wounds and burns. Especially it is recommended for the removal of mucin plaques and film on teeth. The national organization of dentists has recently turned its attention to the problem of giving its members and the public the facts regarding widely advertised medicinal preparations in the dental field and the first preparation analyzed by its chemist (working in the A. M. A. Chemical Laboratory) is Mu-Sol-Dent. It was found to be essentially a solution of common salt, potassium chloride and trisodium phosphate in water. There is present also essential oils and coloring matter. And this is the preparation that is said to prevent tooth decay, tartar and pyorrhea, and to be good for catarrh, hay-fever and sore throat. (Jour. A. M. A., October 20, 1928, p. 1211).

Book Announcements

Pediatrics For the General Practitioner. By HARRY MONROE McCLANAHAN, M. D., Professor of Pediatrics Emeritus, University of Nebraska, Ex-President of the Nebraska State Medical Association, etc. Philadelphia and London. J. B. Lippincott Company. 1929. Octavo of 606 pages with 230 illustrations. Cloth. Price $6.00.

Thyroxine. By EDWARD C. KENDALL, M. S., Ph D., D. Sc., The Mayo Foundation, Rochester, Minn. AMERICAN CHEMICAL SOCIETY, MONOGRAPH SERIES. Book Department, The Chemical Catalog Company, Inc., 419 Fourth Avenue, at 29th Street, New York, U. S. A. 1929. Octavo of 265 pages. Illustrated. Cloth. Price $5.50.

Medical Blue Book of Wisconsin. 1929. Copyright 1929 by State Medical Society of Wisconsin. J. G. CROWNHART, Secretary. 96 pages, cloth. Free to members of that Society; otherwise $10.00. The information includes the more important rules and regulations affecting physicians in their practice and much information of interest to physicians, and is published by the Society for the benefit of its members.

A Comparative Study of World War Casualties From Gas and Other Weapons. By COL. HARRY L. GILCHRIST, MEDICAL CORPS, U. S. ARMY; Chief, Medical Division, Chemical Warfare Service, Chemical Warfare School, Edgewood Arsenal, Maryland. 1928. Octavo of 51 pages. Illustrated.

Betterment of Life Insurance Service. Proceedings of the Twenty-Second Annual Convention of The Association of Life Insurance Presidents, held in the Hotel Astor, New York, N. Y., December 13 and 14, 1928. Octavo of 280 pages. Paper.

Forty-First Annual Report of the Bureau of American Ethnology. To the Secretary of the Smithsonian Institution. 1919-1924. United States Government Printing Office, Washington, 1928. Quarto of 626 pages. Illustrated.

XUM

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Editorial

Considerations in Pleurisy.

Attention to and thought of the pleura enters largely into the day's work of the practitioner at this time of the year. Infections of the respiratory tract lead to involvement of the pleura. At this season, respiratory infections are prevalent. The complications of such infections are frequently found in pleural invasions. Pleurisy may stealthily put in symptoms that are not easily recognized in the presence of the grosser symptoms of pulmonary disease, such as cough and expectoration. Mildly, the "stitch in the side" may at first insinuate itself into the list of the clinical symptoms, and only a careful physical examination by auscultation may enable the examiner to recognize the presence of pleurisy. But this complication or secondary infection is more frequently in incidence than clinical recognition of it leads one to think of in pleural pathology.

Pain about the chest must be evaluated. Clinicians cannot afford to put off investigation of the nature and cause of pain about the chest. Pain about the abdomen has already attained that degree of importance in the mind of the laymen that ensures a careful examination for fear of appendicitis or some other abdominal disease, but pains about the chest are discounted in the lay mind, and, sometimes in the medical mind, by "passing it up" as some "muscular pain" or "intercostal neuralgia". Severe pain might demand consideration, but sensations resembling muscular pain or trivial pain, often an index of pleuritis in its incipiency, does not receive careful investigation. In this way precautions are not begun that might abort or shorten an attack of pleurisy in its several stages of pathology. One should be alert to follow the lead of pain. After the enigmatic action of a respiratory infection is explained and veiled pathology is brought to light by the exhibition of pain about the chest, unsuspected even pleural exudate may be found.

Pleural localization of infection may be exposed, not before proven as a part of a delayed convalescence. Pain may bring to light unsuspected constitutional diseases. Tuberculosis and focal infections may be suggested that had not hitherto been thought of.

Respiration is another symptom of interest in pleurisy. The rate and rhythm have a real significance in pleuritic complications. The rate and depth of respiration will be influenced by the position and degree of pleuritis. It is also influenced by the presence and amount of exudate in the pleural sac. The cyclic respiratory attacks bring new and interesting possibilities in pleural effusion and exudate. Clinicians watch with keen interest the position of the patient in bed or during examination, especally with pain in the chest regions. The rate of respiration associated with pain and the primary factors of the respiratory tract all challenge the acumen of the examiner in the domain of physical examination. In the stage of dry pleurisy respiration may "cut off" and the position assumed by the patient may suggest pleurises.

An inflammation of the pluera may eventuate in the producion of an exudate. The exudate may be serous, serofibrous, seropurulent or hemorrhagic. Such a division of the forms of exudate are arbitrary but useful as a clinical description of the predominating elements in the exudate; whether serofibrous, blood or pus. The remarkable fact about the nature of the exudate is that the effusion is not typical of the germ or infecting microorganism. The exudate of pleurisy in tuberculosis, for instance, may be fibrinous, serous, hemorrhagic or purulent; and, also, pneumococcus pleurisy may terminate in fibrinous, serofibrinous or purulent exudate. Cancer may show the same characteristics. But it is felt by practitioners that a large percentage of serofibrinous effusion from pleurisy is tuberculous. Pneumococcus pleurisy tends more often to become purulent in the terminal stages.

The symptoms of pleurisy with effusion are quite definite. Practitioners, attendant upon pneumococcus infections of the respiratory tract at this time, may wisely be on the lookout for them. Preceded by pains in the chest, fatigue and loss of strength, the patient complains of "difficult breathing"; cyanosis may be present. Pain may be absent but sweating, weakness, rapid shallow breathing will be grouped together. Physical signs are indicated by the suggestive position of the patient, lying upon the affected side, in order to give free play to the unaffected side. One notes the less mobile chest wall, with less concave interspaces or with bulging interspaces on the affected side. The apex beat on the left side may be displaced. Percussion brings out the presence of effusion. This method while requiring certain skill, offers the examiner an excellent means of physical examination, but must be considered with the findings of auscultation. In fat persons, loud and forceful percussion may be required, but the light stroke is more useful in outlining the fluid level and in marking out small collections of fluid. Exploratory puncture also affords a method of direct diagnosis of effusion. It not only discloses absence or presence of fluid but its nature and bacteriological significance. This may be not absolutely reliable under certain conditions of error or technique, but is a most useful method when properly used.

Untoward effects in thoracentesis may be noted in this connection. Serious complications, sudden in nature, may attend this procedure, while it may be performed many, many times without untoward results. At the end of aspiration one may look for unfavorable action, sometimes some hours afterward. Coughing or great pain are signals of distress and the needle should be withdrawn temporarily at least if these symptoms persist after partial withdrawal has failed to relieve them. Faintness is not uncommon and so patients should be tapped in a semi-recumbent and supported position. Pleural shock associated with a sort of faintness calls for immediate suspension of thoracentesis. Hemorrhage may occur as an accident by cutting through the intercostal artery. Patients have been known to bleed to death in a few hours from an undiscovered hemorrhage into the pleural sac, attendant upon a diagnostic puncture of the pleura. Collapse of a patient with pleural effusion in a few seconds after puncture of the pleura has been noted by clinicians.

Empyema may be commented upon as purulent effusion in pleurisy. The purulency of the exudate usually follows a seropurulent one. Pneumococcus and streptococcus infections predominate in empyema, but staphylococcus and mixed infections are found. Tuberculous pleurisy with effusion, not infrequently from dual infections, may become purulent. Lobar pneumonia and influenzal pneumonia are not infrequently associated with pleurisy which may terminate in effusion of a purulent nature.

But practitioners have to deal with complications of respiratory infections in the pleura that are not as easily diagnosed as the common lateral pleurisy with or without effusion. A peculiar localization of the pleuritic inflammation with its exudate may render its discovery a bit more difficult and uncertain by reason of certain conditions. One should always keep in mind the atypical type of pleurisy known as diaphragmatic pleurisy and it should not be considered a rare type. The play of the pain is rather deceptive. The pain may be referred to the abdomen. The upper quadrant of the abdomen, the dorsal region and even the lower zone of the abdomen may be the position of the referred pain. Differential diagnosis of pain in these regions is not easy to make and one must weigh carefully evidence from the physical examination as well as the laboratory in reaching an opinion.

Interlobular pleurisy is another chance of pleurisy with or without effusion. Encapsulation of pleural exudate between lobes and between the lower lobes and the diaphragm may be detected by percussion or puncture or by X-ray examination. Mediastinal pleurisy, pericardial pleurisy, subphrenic pleurisy with encapsulated exudate, give separate pictures in symptoms and signs and may be before the examiner's mind as the diagnosis is sought in obscure chest cases involving respiratory infections.

REFERENCES.

Oxford Medicine, Vol. II, Chap. V.

HEMOPTYSIS

The common causes of coughing up blood are pulmonary tuberculosis and pulmonary infarction; but bronchiectasis, aortic aneurysm, syphilis of the lungs, heart and blood disease

may be less common causes. The diagnostic significance is sometimes difficult and, unless the amount of blood involved is considerable and repeated, is not infrequently unsolved. But it is a feature of respiratory infection which requires the careful consideration of the practitioner and should not be lightly dealt with in treating patients.

Pulmonary Embolus

In heart disease one may not be surprised by the exhibition of the sudden, grave and immediate pulmonary embolus. The original site from which may be launched the embolus may be difficult to designate. The pulmonary embolus arises from factors in the right heart and venous side of the circulation most frequently. The causes are numerous and not always known. In heart disease with failing compensation with the right heart dilated and with venous pressure high, clots may set off into the circulation of the pulmonary route. In infectious diseases, in phlebitis in childbirth, in certain blood diseases, in pleural infectons, in operations on the legs, and in the pelvis, emboli may form. In coronary thrombus in recent months, a series of thrombi have been noted and finally pulmonary thrombus was the sudden cause of the death of the patient. The symptoms depend on the size and localization. If there be occlusion of the trunk of the pulmonary artery or both main branches, death is sudden and immediate. A patient with a sudden seizure of dyspnea, a sudden struggling for breath, pallor and cyanosis, a gasp and unconsciousness with failing pulse and respiration, may present the striking signs of an occlusion of the pulmonary artery by embolism. A varying array of signs may appear, according to whether the embolus possesses main branches and lodges in larger subdivions: a more prolonged display of pulmonary signs may be observed. With the recurrence of influenza with its complications in patients with heart disease, one may think of pulmonary embolus as a possible complication.

News Notes

The Tri-State Medical Association of the Carolinas and Virginia

Will have its thirty-first annual meeting in Greensboro, N. C., February 19, 20 and 21, with headquarters at the O'Henry Hotel. Dr. James K. Hall, Richmond, Va., is president, and has arranged for an excellent program. A special feature will be the clinics which will be on diseases of children by Dr. Edward A. Park, of Johns Hopkins Hospital, Baltimore; an allergy clinic by Dr. Warren T. Vaughan, Richmond; a clinic in general medicine by Dr. Thomas McCrae, of Jefferson Medical College, Philadelphia; one on skin diseases by Dr. A. Benson Cannon, of the Medical Department of Columbia University; and another in nervous and mental diseases by Dr. Michael P. Lonergan, chief psychiatrist of the State Hospital on Ward's Island, New York. Patients for this latter clinic will be furnished by the State Hospital at Raleigh.

The program for Tuesday evening, February the 19th, has been prepared especially for the public and will be held in the auditorium of the North Carolina College for Women and will be broadcast by radio. At this session, a gavel made of timber from "Belroi", the ancestral home of Dr. Walter Reed in Gloucester County, Va., will be presented to the Association by Dr. J. Allison Hodges, of Richmond, and will be accepted by Dr. Stuart McGuire, Richmond, on behalf of the Association. Dr. James K. Hall will present his presidential address this evening and addresses will be made by Dr. Winfred Overholser, Boston, Mass., (invited guest) on "The Psychiatrist in Court". Dr. Joseph L. Miller, Thomas, W. Va., (invited guest) on "Has Medical History Any Value?", and by Dr. Charles O'H. Laughinghouse, Health Officer of North Carolina.

The Wednesday evening program will be more highly technical and will include papers by Dr. Wm. deB. MacNider, of Chapel Hill, N. C., and the following invited guests: Dr. Thomas McCrae, Philadelphia; Dr. A. Benson Cannon, New York; Dr. John A. F. Kolmer, Philadelphia; Dr. Edwards A. Park, Baltimore; and Dr. Walter E. Lee, Philadelphia.

This is a meeting that members cannot afford to miss and should so arouse the interest of non-members that they will wish to join and attend. To repeat—the dates are February 19, 20, and 21; the place—Greensboro, N. C.

Tuberculosis Meeting to be Held in Richmond.

The annual meeting of the Virginia Tuberculosis Association will be held February 28th,

at St. Paul's Parish House, Richmond, under the presidency of Dr. William F. Drewry, of Petersburg. At the morning session, beginning at 9:30, there will be a discussion of local tuberculosis programs, led by Dr. Kendall Emerson, Managing Director of the National Tuberculosis Association, followed by talks on case finding, sanatorium treatment, home care, educational campaigns, newspaper publicity, lectures and the use of health literature.

Dr. Basil B. Jones, well known Richmond pediatrician, will lead a discussion on Tuberculosis in Childhood.

Following this morning session the meeting will adjourn for luncheon, to convene again at 3 P. M. for a business meeting of the Association, election of directors and officers, adoption of program and budget, etc.

Dr. Kendall Emerson, of New York, will make an address at 8 P. M. in the auditorium of St. Paul's Parish House. This will be a short meeting to which all physicians are particularly invited. He will discuss matters of great interest to doctors, touching on the present sanatorium situation, and the future functions of sanatoria; the future of surgical work in tuberculosis (Dr. Emerson is himself a well known surgeon); and a brief summary of the findings of the Medical Research Committee.

The Corner Stone of Puericulture.

The Division Superintendents at their annual meeting in Richmond during Thanksgiving week adopted a resolution that may prove to be epoch-marking in its results.

By this resolution the Superintendents' Association sets a corner stone for the monumental work at which the State Department of Health has been striving through its co-operation with the school in behalf of the physico-mental fitness of the child.

Where school and home join hands through the beneficial intervention of the family physician, puericulture dawns and racial health begins.

We take pleasure in bringing the resolution passed by the Superintendents' Association before the Medical Society of Virginia, through the courtesy of the VIRGINIA MEDICAL MONTHLY.

RESOLUTION.

We, the Health Committee of the Division Superintendents' Association having been notified of the appointment of a Child Welfare Committee by the State Medical Society to advise the State Department of Health in its Child Health Program, do hereby express our gratification and suggest that the Superintendents pass the following resolution:

WHEREAS, we, the Division Superintendents of the State, having long realized that our efforts to educate the children of the Commonwealth, are sorely minimized and handicapped by the physical unfitness of the children we have to teach; and

WHEREAS, we understand that many of these defects that handicap the children in getting their education are largely preventable,

THEREFORE, we, the Division Superintendents' Association of Virginia Schools, do respectfully request the Medical Society of Virginia to undertake the study of the best means of preventing or correcting the bodily defects of school children, with the ultimate aim of sending us physically fit children to teach, reaching at least the present minimum standard adopted by the State Departments of Education and Health—the Five Point standard.

SUPERINTENDENTS' HEALTH COMMITTEE.
(Signed)
C. B. GREEN, *Chairman*, Mecklenburg County.
A. S. GREEVER, Tazewell County.
R. M. NEWTON, Elizabeth City County.
T. B. GAYLE, Stafford-King George Counties.
L F. SHELBURNE, City of Staunton.

Award for Outstanding Scientific Achievement.

For his work in an investigation of the ductless glands and particularly in his isolation of pituitary hormones, Dr. Oliver Kamm, director of chemical research of Parke, Davis & Company, manufacturing chemists, was awarded the $1000 prize by the American Association for the Advancement of Science, on January the 2nd, for the "most noteworthy contribution to science presented at the annual meeting," in New York. Some 2,000 scientists delivered addresses at this time.

After twelve years' work in the Parke, Davis & Company Laboratories, Dr. Kamm isolated two hormones—the alpha and beta—from the posterior lobe of the pituitary gland, which is held by chemical scientists to be equal in importance to the isolation of insulin and the discovery of adrenalin.

The alpha hormone is the so-called oxytocic principle. The beta hormone is the blood-pressure-raising principle. Dr. Kamm also showed definitely that the beta hormone has the power of controlling the excessive output of water. It does not act upon the kidneys, but controls the utilization of water by the individual tissues of the body. The usefulness of this beta hormone is now under investigation in diseases characterized by excessive loss of water, such as diabetes insipidus, burns, cholera, other infectious diseases, and surgical shock.

Dr. Kamm says that, "Water-intoxication, with its alarming symptoms leading even to unconsciousness, is very rare. The other ex-

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treme, that of water-poverty, is rather more common, and is characterized by extreme thirst and excessive elimination of water. This condition, known clinically as diabetes insipidus, is relieved at least temporarily by pituitary extract, and it has just been found that the beta hormone possesses this remarkable action."

It is stated that only a very few grams of highly purified alpha and beta hormones are as yet available, and these are known commercially as pitocin and pitressin, respectively. Although the Parke, Davis Research Laboratories use the methods of micro-analysis, a single laboratory experiment requires the pituitary glands of 50,000 cattle.

Importance of Undulant Fever Being More Widely Recognized.

Undulant fever, a disease contracted from cattle and hogs which are infected with contagious abortion, is being more widely recognized as a problem of considerable importance from a public health standpoint, as persons who drink raw milk from infected cattle or who handle hogs or cattle that are infected are likely to contract the disease. A number of cases of this disease have been reported from various States.

The name, "undulant fever", is applied to the disease because the attacks of fever come in waves or undulations. The disease was first recognized on the island of Malta in the Mediterranean, and it was thought for a time that it was spread only through the milk of goats, but it is now known that the disease may be contracted from cattle and hogs. The disease is not only disabling but extremely chronic in duration as the patient may be ill for two or three years before any improvement is noted.

As many cases are contracted from infected milk, the chief precautions are the use of pasteurized milk and care when coming in contact with animals known or suspected to be infected with contagious abortion. In a series of cases of undulant fever recently studied among adults living on a farm there were thirty-nine males and six females; six of the male cases are known to have derived their infection from hogs.

Dr. C. M. Miller in the Year Book

The Practical Medicine Series, comprising eight volumes on the year's progress in Medicine and Surgery, under the general editorial charge of Dr. Charles L. Mix, and published by the Year Book Publishers, Chicago, affords one an excellent means of making a practical survey of the medical and surgical progress. In the Volume, Eye, Ear and Throat, local interest is found in the fact that the introduction to the "The Eye" department, presenting "The Relation of the Ophthalmologist to the General Medical Profession" is by Dr. Clifton M. Miller, of Richmond, Va. Dr. Miller in this chapter recites the historical development of the eye specialist and points out important relationships in medical practice that must be maintained between the physician and specialist if the best interest of the patient is to be attained; further, that the specialist should sustain an active interest and inquiry into the collateral branches of medicine, particularly physiology and pathology.

The Annual Congress on Medical Education, Medical Licensure and Hospitals

Is to be held at the Palmer House, Chicago, Ill., February 18, 19, and 20, and all members of the profession interested in these subjects are invited to attend. Dr. Ray Lyman Wilbur, of Stanford University, Calif., is chairman of the Council on Medical Education and Hospitals, and Dr. Guy L. Connor, Detroit, Mich., is president of the Federation of State Medical Boards of the United States.

At this meeting the Federation of State Medical Boards hopes to develop a plan of national scope by which it may secure satisfactory general enforcement of medical practice acts and other health-protective measures. For this purpose, the Federation appeals for attendance and co-operation of the secretary and executive officer of every state medical association and of every state board of health in the United States.

If 250 attend these conferences from points outside of Chicago, return tickets may be had for one and a half rate on the certificate plan.

Dr. Thomas P. Haslam,

Associate in the Department of Pathology, Medical College of Virginia, in 1927-28, has returned to Texas and is now director of the Baylor Out-Patient Clinic at Dallas, Texas.

Noted Among Bank Directors.

The following are some of the Virginia doctors whose names have been noted as bank directors in recent reports from many sections of the State: Dr. W. O. Smith, Altavista; Dr. R. E. Booker, Lottsburg; Dr. R. D. Garcin, Richmond; Dr. W. W. Wilkinson, LaCrosse;

Dr. A. T. Hart, South Hill; Dr. A. W. Lewis, Aylett; Dr. William E. Croxton, West Point; Dr. U. H. Johnson, Barhamsville; Dr. J. M. Shackelford, Martinsville; Dr. B. L. Carter, Blue Spring Run; Dr. B. R. Hudnall, Covington; Dr. John M. Williams, Petersburg; Dr. C. S. Dodd, Petersburg; Dr. M. P. Rucker, Bedford; Dr. S. B. Moore, Alexandria; and Dr. O. A. Ryder, Alexandria.

Dr. R. T. Givens,

Of Glen Wilton, Va., is spending some time at New Castle, Va., so as to be with his father who is in failing health.

Dr. T. J. Stanley,

Beaver Dam, Va., who suffered a stroke of paralysis in December, is now reported as being much improved.

Dr. and Mrs. Henry Clay Smith,

Williamson, W. Va., former residents of Virginia, recently visited relatives in Roanoke, Va.

Cuba Holds a National Child-Welfare Congress.

In December, Cuba held its first National Congress of Child Welfare, organized by the University Pedagogical Association. This action was inspired by the Fifth Pan-American Child Congress held in Habana a year ago. The executive committee includes leading physicians, educators, and lawyers. There were official delegations from the provinces and cities. Many interesting reports were presented.

Dr. Tom A. Williams,

Formerly of Washington, D. C., has moved to Rome, Italy, where he is pursuing researches in Mediaeval Pathology. He continues the practice of Neurology and Psychiatry among American and English people, with offices at 47 Via Lombardia.

Dr. Homer S. Henkel,

Staunton, Va., after an illness of several months, went to Johns Hopkins Hospital, Baltimore, for treatment, early in January.

Special Course at University of Bordeaux.

There will be a special post-graduate intensive course in surgery of the ear, nose and throat, trans-maxillary and plastic surgery, bronchoscopy, etc., under Prof. Georges Portmann at the University of Bordeaux, France, this summer. It is stated that the course will begin July 22nd and last for five weeks and will be limited to twelve students. Information about this may be obtained of Dr. Leon Felderman, 4428 York Road, Philadelphia, Pa.

Dr. Richard Cannon Eley,

Of the class of '25, University of Virginia, Department of Medicine, is at present an assistant in pediatrics at the Harvard University Medical School, his appointment having become effective September 1st, last.

Appointments with Parke, Davis & Company.

Dr. A. William Lescohier has been appointed general manager of Parke, Davis & Company, large manufacturers of pharmaceutical and biological products, with home offices and laboratories in Detroit, Mich., and branch laboratories in a number of foreign countries. Dr. Lescohier has been connected with this company for the past twenty years. He is a graduate in medicine and a fellow of the American Medical Association. After graduation in 1909, he entered the Company's service as a member of its scientific research staff; in 1918 he was placed in charge of the production of serums, vaccines, antitoxins and other biological products; in 1925 he became director of the Department of Experimental Medicine, and has most recently occupied the position of assistant to the president.

Parke, Davis & Company also announces the appointment of Dr. Louis Klein as Promotion Manager and Mr. Ralph G. Sickels as Advertising Manager. Both men have been connected with the Company for a number of years, Dr. Klein as manager of the department of medical service, and Mr. Sickels as a member of the advertising staff.

The American Association for the Study of Goiter

Will hold its annual meeting at Dayton, Ohio, on March 25, 26 and 27, under the presidency of Dr. S. D. Van Meter, of Denver, Col. The primary object of this association is to bring together each year men who are especially interested in the study of goiter and its associated problems. Members of state and provincial medical societies are eligible and cordially invited to participate as attending members.

The first day of the Dayton meeting will be given over to diagnostic clinics in the morning and several short papers during the afternoon, chiefly concerned with recent experimental work. On the second day, operative clinics will be held at the Miami Valley Hospital, St. Elizabeth's Hospital and at the Soldiers' Home

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Hospital. The afternoon of the second day and the morning and afternoon of the third day will be given over to the presentation and discussion of scientific papers.

The headquarters will be at the Hotel Miami. Dr. William A. Ewing is President of the Montgomery County Medical Society under whose auspices the meeting is to be held. Dr. E. M. Huston is the General Chairman of the Committee on Arrangements. Dr. H. C. Haning is Chairman of the Hotel Committee. All communications in regard to hotel reservations should be addressed to Dr. Haning at the Reibold Building, Dayton, Ohio.

Food Adulteration Decreases.

Considering the enormous increase in the volume of manufactured foods during the last 20 years, officials of the Food, Drug and Insecticide Administration of the U. S. Department of Agriculture, in a recent report, state that the proportion found adulterated today is very small. Federal and State food officials are constantly on the alert, however, to restrain that small portion of manufacturers who will still take the chance to jeopardize the health of consumers, by adulterating food products, whether the adulteration results from carelessness of from deliberate intent. As the result of effective enforcement of Federal and State food laws during the period named, the food products sold on the market today are freer from adulteration and misbranding than ever before.

One matter to engage the attention of the officials in the near future is to effect suitable changes in the formulas for the various preparations on the market labeled for the treatment of malaria which do not contain adequate quantities of the cinchona alkaloids to meet the requirements for the treatment of the disease. Changes in the labeling will also be insisted upon where the claims made are unwarranted by the composition of the preparation.

The Tri-State Medical Society of Kentucky, Ohio and West Virginia

Held its quarterly meeting in Huntington, W. Va., January 24, under the presidency of Dr. William R. Laird, of Montgomery, W. Va. In the absence of the president, however, Dr. R. K. Buford, of Charleston, W. Va., presided. There was a large attendance and interesting papers were read by Dr. Russell Cecil, of New York; Dr. Ralph Lloyd, of Brooklyn; and Dr. Andrews, of Cincinnati. Dr. E. Leo Berger, of Brooklyn, and Dr. Louis E. Phaneuf, of Boston, invited guests, were prevented by illness from attending and taking part in the program.

On Committees of Kiwanis Club.

Drs. I. K. Briggs, R. H. Fuller and George A. Stover have been named as members of committees of the Kiwanis Club of South Boston, Va.

China's National Child-Welfare Association.

The National Child-Welfare Association of China was recently formed under the direction of Dr. Kung, Minister of Industry, Commerce, and Labor, with headquarters at Shanghai. This new organization is an outgrowth of the Canton child-welfare committee, in which many high officials and merchants and their wives have taken a keen interest. It will cooperate with the Association for the Welfare of the Children of China (inc.), which has its headquarters in New York City. The aim of the association is to improve the living conditions of poor and homeless children "according to the spirit of the Golden Rule."

Dr. Stuart O. Foster,

Roanoke, Va., is spending sometime studying in the various hospitals in Boston, New Haven and New York, preparatory to specializing in internal medicine in Roanoke. For the past two months he has been studying diabetes under Dr. E. P. Joslin, of Boston.

Officers of Hospital Staff.

At a meeting held early in January, Dr. Mason Roamine was elected chairman of the Petersburg Hospital, Petersburg, Va. Other officers chosen for this year are: Dr. George H. Reese, vice-chairman; Dr. C. W. Lynn, secretary; Dr. Philip Jacobson, vice-secretary. Dr. Romaine succeeds Dr. E. L. McGill as chairman. Dr. L. S. Early was nominated for membership on the board of directors.

Dr. and Mrs. J. Bolling Vaiden,

Recently of Highland Springs, Va., have moved to Lawrenceville, Va., where Dr. Vaiden is continuing the practice of his profession.

Dr. W. L. Early,

Wolftown, Va., was recently in a hospital at Miami, Fla., for injuries received in an automobile accident. He had gone to Florida to recuperate from injuries received in an accident when the second one occurred.

Capital Investment in Medicine.

As a part of the work of the Committee on

the Cost of Medical Care, the American Medical Association has sent out questionnaires to 25,000 physicians, selected at random, to secure data pertaining to the invested capital involved in physicians' education, intern training, post-graduate courses, office and travelling equipment, office maintenance, medical society affiliations, library maintenance and medical licensure fees. The questionnaire is anonymous and there need be no fear of embarrassing results from the information obtained.

The object of this item is to suggest the importance of this survey and to ask any of our readers who have received this questionnaire to give their cooperation by answering and returning the questionnaire as soon as possible.

Dr. and Mrs. H. D. Howe,

Hampton, Va., left the latter part of January for New York, from which place they were going with some friends for a Mediterranean cruise.

Founder's Day at Medical College of Virginia.

Founder's Day of the ninety-first session of the Medical College of Virginia, Richmond, will be observed at Monumental Church, this city, on February the 15th, beginning at 10:30 A. M. The academic procession, including the board of visitors, invited guests, faculty and students, will be formed at McGuire Hall, 12th and Clay Streets, at 10:10 o'clock. Dr. Joseph L. Miller, Thomas, W. Va., medical historian and bibliophile, will speak on "Physicians of the Old South, Their Character and Education," and Dr. Charles R. Robins, Richmond, will speak on "Beginnings in Nursing Education under Sadie Heath Cabaniss in the Old Dominion Hospital." Following these exercises, Cabaniss Hall will be open to the public from 11:30 to 12:30 o'clock.

North Carolina to Have Health Examination Campaign.

According to the *Illinois Health Messenger*, the North Carolina State Board of Health has created a division in its organization whose functions will be to promote the habit of periodic health examinations. The public will be advised to go regularly to their family physicians for this purpose. The unit will be made up of one doctor and one nurse and the program includes demonstrations for doctors in making the examinations on the one hand, and of promoting the idea of health examinations through lectures to various organizations, such as parent-teacher associations, civic clubs, colleges, ministerial associations and through popular literature and newspapers on the other hand.

Dr. Charles Behney,

Of Philadelphia, associate in the department of gynecology, University of Pennsylvania Hospital, and his wife, recently visited relatives and friends in Lynchburg, Va.

The Venereal Disease Menace.

If your attention has not been called to these charts 9 by 12 inches, you may be interested in knowing that a set of fifty may be purchased from the Superintendent of Documents, Government Printing Office, for $1.00.

This is an exhibit for adults and was prepared by the United States Public Health Service for use in its Co-operative Work with the State Departments of Health. These posters are an extremely valuable aid to lecturers and physicians as the various points may be shown more clearly with the use of these pictures.

Remittance should be made by check or postal money order, payable to The Superintendent of Documents, Government Printing Office, Washington, D. C. Do not send stamps.

Civil Service Examinations.

The U. S. Civil Service Commission, Washington, D. C., announces the following open competitive examinations, applications for which must be on file with the Commission in Washington, not later than dates named:

Physiotherapy assistant by May 7th.

Social worker (psychiatric) and junior social worker; graduate nurse, graduate nurse (visiting duty), and graduate nurse (junior grade); physician and associate physician; and occupational therapy aide and occupational therapy pupil aide by June 29th.

Dietitian by July 1st.

Full information about these may be obtained from the Commission.

Program of Post-Graduate Instruction.

The Gill Memorial Hospital announces a course in post-graduate instruction in ophthalmology, otology, rhinology, laryngology, faciomaxillary surgery, oral surgery, bronchoscopy and esophagoscopy, to be given at the Hospital, 711 South Jefferson Street, Roanoke, Va., April 8th to 13th, inclusive. Among those who will have clinics at this time are: Dr. Wells P. Eagleton, Newark, N. J.; Dr. Walter Dandy, Baltimore; Dr. E. G. Gill, Roanoke; Dr. Cornelius G. Coakley, New York; Dr.

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Robert H. Ivey, Philadelphia; Dr. John A. L. Kolmer, Philadelphia; Dr. H. D. Scarney, Roanoke; Dr. H. S. Hedges, Charlottesville; Dr. John Wheeler, New York; Dr. D. L. Poe. New York; and Dr. Clyde E. McDannald, New York. Information about this course may be obtained from the Hospital.

Physicians' Business Bureau, Inc.

The Richmond Academy of Medcine has endorsed the Physicians' Business Bureau, Inc., which now numbers among its members a large number of the medical profession of the city. At the recent annual meeting of the Bureau the following officers and directors were elected: President, Dr. Wm. H. Parker; first Vice-President, Dr. R. W. Miller; second vice-President, Dr. Thos. D. Jones; Secretary and Treasurer, Dr. R. S. Faris. These with the following members compose the Board of Directors: Dr. M. L. Anderson, Dr. Joseph Bear, Dr. H. W. Blanton, Dr. A .I. Dodson and Dr. Fred M. Hodges.

The objects of the Bureau are the education of the public to the prompt payment of their doctors' bills, and the collection in an ethical way of its members' delinquent bills—this without hardship to the patient, as each case is investigated. The rates are reasonable.

The Bureau is a non-profit earning organization. The medical and allied professions alone can own stock, and, when capital is repaid as the Bureau becomes self-supporting, the surplus earned after making allowance for overhead expenses goes to a reduction of collection charges. All officers serve without compensation, and have given their time freely to make it a success. Results in other cities where the plan has been working for some time are most gratifying, as the public has gradually become educated to the fact that the accounts of physicians and hospitals should be paid the same as are other obligations.

It is apparent from the records of the Bureau here that the public welcomes the idea, and the members who are using the collection end are very enthusiastic and report no offense given patients.

Married.

Dr. William O. McCabe, Thaxton, Va., and Mrs. Lola Weeks Serber, December, 1928.

Dr. Joseph T. McKinney,

Was recently elected president of the Roanoke Kiwanis Club for the year 1929.

Danville Hospitals Consolidate.

Announcement was made early in January that negotiations had been completed for the merging of the Memorial Hospital and Edmunds Hospital, of Danville, Va., the merger to be completed in sixty days. This was done under satisfactory terms as being for the best interests of all concerned. It was announced that pupil nurses at the Edmunds Hospital would be transferred to other hospitals and that Dr. Edmunds would not sell his building for hospital purposes within ten years.

Dr. Drewry to Direct Virginia Mental Hygiene Bureau.

Dr. William F. Drewry, Petersburg, Va., for many years superintendent of the Central State Hospital in that place, has been appointed to the position of director of the bureau of mental hygiene in Virginia—a division of the Department of Public Welfare of this State. Dr. Drewry is well known as an expert in mental diseases, is a former president of the American Psychiatric Association and of the Medical Society of Virginia, and has for several years been a member of the governor's advisory board on mental hygiene. From his previous work and training, Dr. Drewry is especially fitted for his position. He is spending the month of February in the north where he is studying the operation and work of mental hygiene bureaus conducted in New York and Massachusetts with a view to equipping himself for his work in Virginia. He will enter upon his new work March the 1st. Headquarters will be in the old Virginia Hospital Building at 11th and Clay Streets, Richmond.

Dr. George W. Black,

Of the class of '24, Medical College of Virginia, after some time spent at Pinevile, North Carolina, has moved to Charlotte, with offices, at 1515 South Bolveard. He is engaged in general practice.

Dr. Johns Becomes Chief Surgeon at Johnston-Willis Hospital.

Announcement was made by the staff of Johnston-Willis Hospital, Richmosd, Va., following the death of Dr. Murat Willis, that there was no change in the staff of the Hospital. Dr. Frank S. Johns, who had been connected with the hospital for fifteen years and had been Dr. Willis' partner for ten years, became chief surgeon with Dr. Donald S. Daniel, recently of the Community Hospital, at Nassa-

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wadox, Va., as his associate. The various departments of the hospital will continue to be conducted in accordance with the policy of the founders of the hospital, Drs. George Ben Johnston and Dr. Murat Willis.

The surgical department of the Nassawadox Hospital will also continue under Dr. John's supervision. Dr. Harry L. Denoon, Jr., Richmond, succeeded Dr. Daniel in the surgical department of the hospital at Nassawadox.

The following doctors are members of the staff of Johnston-Willis Hospital:

Drs. Randloph L. Anderson; A. F. Bagby; O. C. Brunk; Chas M. Caravati; J. G. Carter; Harvey DeJ. Coghill; Dean B. Cole; C. C. Coleman; Robert H. Courntey; Don S. Daniel; O. B. Darden; T. Dewey Davis; H. W. Decker; R. B. Easley; N. T. Ennett; Clifford A. Folkes; Carroll H Fowlkes; Richard W. Fowlkes; E. T. Gatewood; R. Finley Gayle; I. H. Goldman; I. T. Gorsline; C. C. Haskell; Emory Hill; J. Morrison Hutcheson; F. S. Johns; Basil B. Jones; Martin Lasersohn; F. H. Lee; J. G. Lyerly; H. Norton Mason; Howard R. Masters; H. Page Mauck; C. L. Outland; Robert S. Preston; Lawrence T. Price; W. W. Rixey; M. P. Rucker; P. E. Schools; W. A. Shepherd; J. B. Stone; Daniel D. Talley; J. McCaw Tompkins; Beverley R. Tucker; Dougles VanderHoof; B. H. Welford; Lawther J. Whitehead; and Jas. M. Whitfield, Jr.

Mortality Rate From Automobile Accidents Increases.

The Department of Commerce announces that for the 52-week period ending December 29, 1928, there were 7,516 deaths reported from seventy-eight cities in the United States as compared with 7,084 for the 52-week period ending December 31, 1927, showing a rate for 1928 of 22.9, or an increase of 5 per cent in the rate of such deaths in a single year.

Dr. G. L. Morriss,

Buckingham, Va., is spending sometime in New York City, where he is taking up postgraduate work.

Cities Offering Aid to Hard-of-Hearing Children.

Twelve cities of the United States have been placed on the honor roll of the American Federation of Organization for the Hard-of-Hearing; they test the hearing of school children by audiometer, have special classes to teach speech-reading to partly deaf children, and utilize available clinics. One of these cities—Rochester—has an ambulatory clinic especially for treating the school children. Several cities are meeting two requirements, and it is hoped that they will soon complete the third point and be eligible for the honor roll. A number of others are offering instruction in speech reading for the hard-of-hearing.

A Use for Condemned Murderers.

The Journal of the American Medical Association for January 5, 1929, in its London letter, tells of an address at a cancer campaign meetnig, in which Dr. F. G. Norbury stated that investigators were so hampered in having their experiments confined to the lower animals that he suggested that individuals condemned to death should be allowed, if willing, to give their bodies for experiment. He stated that they should be told of the danger of death and great suffering but, if they decided to take this chance for life, the investigator would at once produce cancer in him. Should he live for, say, five years, he should be released, especially if cured. Then, whether he lived or died, he would have made some reparation for the injury done to society.

Dr. J. B. Dalton,

Richmond, Va., has just completed a year's internship in New York City. After a vacation spent with his family, he left late in January for Boston, where he is making a further study in orthopedics.

Dr. D. W. Hamrick,

Of the class of '26, University of Virginia, Department of Medicine, after two years' connection with the department of pathology of the University of Missippi, recently located in Corinth, Miss., where he is engaged in the private practice of medicine. He limits his work to diseases of the eye, ear, nose and throat.

The Value of Outdoor Sunshine.

A person in an office or schoolroom having windows of the special glass which permits the passage of the sun's ultra-violet rays, and sitting in the direct rays of the sun, would get about as much ultra-violet light in three hours as in one hour in the open sunshine. Sitting in the same room beyond the direct rays for fifteen to twenty noontide sunlit hours would give an average effect equal to that of only two minutes in the outdoor sun. This is the conclusion of a study recently made at Johns Hopkins University. The report of the study states the opinion that this type of glass has undoubted usefulness in solariums, but that its installation in the windows of schools and offices would seem to be of little value.

For Sale—

Twenty years' established general practice in a Virginia town of 3,000 and a community

of 12,000. Within sixty miles of Washington, D. C., on main line railway. Fine schools and churches. Five hard surface roads outgoing, making this an all closed car practice. Two factories in town. Collections around $7,000 a year and can be increased. Wish to give up general practice. Own half interest with another physician in a $40,000 modern office and apartment building in center of town. Building has electric elevator and steam heat and pays good income. Will sell my interest in building to physician who takes over my practice, or half of my interest if allowed to continue office for chronic cases, with no house practice. Only good general man need apply. Address No. 139, care this journal.

Wanted to Buy—

Physician's combined residence and office property in city of between five and ten thousand population. Address No. 158, care this journal.

Obituary Record

Dr. T. Edwin Baird,

Norfolk, Va., died January the 6th, following a long illness. Though he was able to be up and even attend patients at times, frequent asthmatic attacks of a very severe type wore out his strength. Dr. Baird was born at Waverly, Va., sixty-three years ago. He graduated in medicine at the Medical College of Virginia in 1890 and had been a member of the Medical Society of Virginia since the following year. His wife survives him.

Dr. Robert H. Latane,

Buchanan, Va., died January the 12th, having been in failing health for some months. He graduated in medicine from the Medical College of Virginia in 1883 and became a member of the Medical Society of Virginia that year. His wife, three sisters and a brother, Dr. T. B. Latane, of Stevensville Va., survive him.

Dr. Nathaniel R. Smith,

Gainesboro, Va., died last May, at the age of sixty-eight years, after having been in bad health for sometime, according to information recently received at this office. He graduated from the Kentucky School of Medicine, Louisville, in 1883, and had been a member of the Medical Society of Virginia for a number of years.

Dr. Edward Thomas Mason,

Savageville, Va., died December the 5th at the age of fifty-eight years. Dr. Mason studied medicine at the University of Maryland, Baltimore, from which he graduated in 1891.

Dr. William Andrew Wallace,

Spartanburg, S. C., an alumnus of the former University College of Medicine, Richmond, Va., in the class of 1906, died at his home in Spartanburg, S. C., January the 30th. He was a native of Augusta County, Virginia, and forty-six years of age. He had made his home in Spartanburg for about twenty years. His wife and three children survive him.

Dr. Joseph Goldberger,

Surgeon in the U. S. Public Health Service and well known in this State where he had spoken before medical societies, died in Washington, D. C., January the 17th, following an illness of several years. He was fifty-four years of age, graduated from Bellevue Hospital Medical College, New York, in 1895, and was commissioned in the Service in 1899. His experimental work with pellagra and its preventive foods won him a high position in the medical profession.

Dr. Joshua Tayloe,

Washington, N. C., died December the 19th, at the age of fifty-eight years. His death was due to cerebral hemorrhage. He graduated from Bellevue Hospital Medical College, New York, in 1892. Dr. Tayloe was prominent in the medical profession of his State and was likewise identified with many civic enterprises.

Dr. Clarence Moore Bynum,

Marshville, N. C., a graduate of the Medical College of Virginia in 1914, died December the 17th, of pneumonia following influenza. He was thirty-six years of age.

Dr. Robert Vance Brawley,

Salisbury, N. C., died at his home in that place, January the 5th, death being due to pneumonia. He was fifty years of age and studied medicine at the former University College of Medicine, Richmond, from which he graduated in 1901. His practice was limited to ophthalmology.

Dr. Levi A. Walker,

Burlington, N. C., also an alumnus of the University College of Medicine, Richmond, in the class of 1898, died at his home in that place December the 28th after a brief illness, though he had been in bad health for several years. He had for many years been health officer of Burlington.